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USSR AND EASTERN EUROPE SCIENTIFIC ABSTRACTS

CHEMISTRY

No. 60

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12 July 1978

USSR AND EASTERN EUROPE SCIENTIFIC ABSTRACTS

CHEMISTRY

No. 60

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CONTENTS	PAGE
Alkaloids	1
Analytical Chemistry	5
Adsorption Phenomena	7
Biochemistry	8
Electrochemistry	9
Environmental Pollution	10
Fertilizers	16
Nitrogen Compounds	18
Organophosphorus Compounds	22
Pesticides	64
Pharmacology and Toxicology	69
Polymers and Polymerization	75
Water Treatment	77
Personalities	80
Eastern Europe	81

USSR

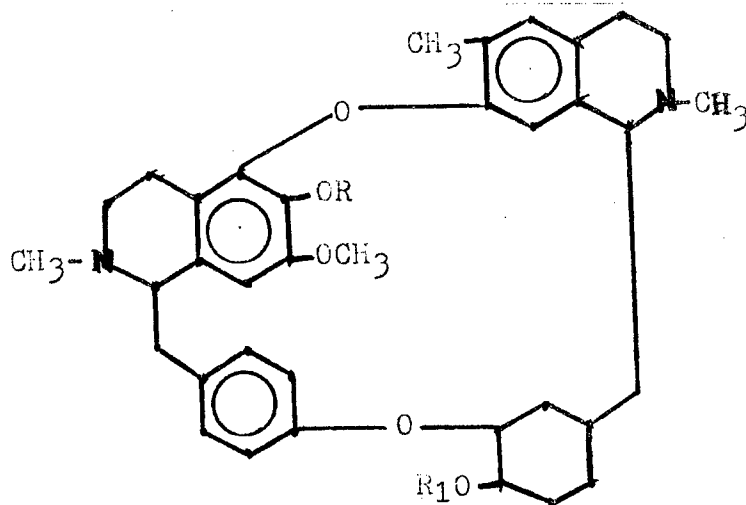
UDC 547.944/945

THALICTRUM SULTANABADENSE ALKALOIDS

Tashkent KHIMIYA PRIRODNYKH SOYEDINENITY in Russian No 1, 1978 pp 139-140
manuscript received 30 Sep 77

ABDIZHABBAROBA, S., MAYEKH, S. KH. AND YUNUSOV, S. YU., Order of the Labor
Red Banner Institute of the Chemistry of Natural Products, Academy of
Sciences UzSSR, Tashkent

[Abstract] In the continuation of their studies of the alkaloids, extracts of the plants *Th. sultanabadense* Stapf, collected in the region of Lyashkarakshe, were investigated. From the total volume of the bases extracted, two products were isolated: gernandesine and a novel biscoclaurnoyl base - talbadensine, for which the following structure was proposed:



References 4: 1 Russian, 3 Western.

USSR

UDC 547.944/945

CIRCULAR DICHROISM OF SOME PHTALIDEISOQUINOLINE ALKALOIDS

Tashkent KHIMIYA PRIRODNYKH SOYEDINENIY in Russian No 1, 1978 pp 103-105
manuscript received 27 Sep 77

MOISEYEVA, G. P., ISRAILOV, I. A., YUNUSOV, M. S. and YUNUSOV, S. YU.,
Order of the Labor Red Banner Institute of the Chemistry of Natural
Products, Academy of Sciences UzSSR, Tashkent

[Abstract] It has been established that protonation of threo isomers of phtalideisoquinolines results in an inversion of the signs of 'L_b and 'B Cotton effects in the range 290-200 mμ: the erythro isomers changed only the amplitudes of respective Cotton effects on the circular dichroism curves. A relationship has been established between the conformations of threo- and erythro- forms and the relative intensities 'L_b of the Cotton effect. In alcohol solutions the erythro compounds showed a stronger Cotton effect in the range of 320 mμ, while the threo isomers exhibited it at 290 mμ. Figure 1, references 5: 2 Russian, 3 Western.

USSR

UDC 547.944.6

TROPOLONE ALKALOIDS

Tashkent KHIMIYA PRIRODNYKH SOYEDINENIY in Russian No 1, 1978 pp 3-26
manuscript received 15 Jun 77

YUSUPOV, M. K. and SADYKOV, A. S., Tashkent Order of the Labor Red Banner
State University Imeni V. I. Lenin

[Abstract] A review of the literature covering the location of colchicine containing plants, isolation of tropolone alkaloids from these sources and the chemical reactions of these alkaloids has been given. About 15 different plants have been identified as sources of tropolone alkaloids. More than 90 alkaloids have been isolated from these plants. Colchicine and colchamine are the most important representatives of this group. The review covers reactions modifying the three individual rings of the system as well as general reactions of substitution, rearrangement, reduction and oxidation. Figures 16, references 215: 51 Russian, 34 Czech, 1 Bulgarian, 1 Polish, 128 Western.

USSR

UDC 547.586+547.724.1.2.+547.785.5

SYNTHESIS OF AROMATIC AND HETEROCYCLIC ANALOGUES OF THE NATURAL GROWTH
INHIBITOR - ABSCISIC ACID

Tashkent KHIMIYA PRIRODNYKH SOYEDINENIY in Russian No 1, 1978 pp 63-70
manuscript received 25 Oct 77

LIVSHITS, N. D., KADYROV, CH. SH. and ABDULLAYEV, N. D., Order of the
Labor Red Banner Institute of the Chemistry of Natural Products, Academy
of Sciences UzSSR, Tashkent

[Abstract] Aryl analogues of abscisic acid were obtained by the
Reformatskii condensation of substituted benzylidene acetones with
ethylbromoacetate. The Wittig reaction of substituted furylidene acetones
and ketones containing heterocyclic nuclei with carboethoxy-methylene-
triphenylphosphorane led to the formation of furyl and hetero-cyclic
analogues of abscisic acid. The products of the Reformatskii reaction
were mostly trans-trans oriented, while the cis-trans isomers predominated
in the Wittig reaction. Analysis of the data from bio-assays obtained on
wheat and peas showed that all of the synthetic products had a 300-400
fold lower activity than the parent abscisic acid. References 8: 6
Russian, 2 Western.

USSR

UDC 547.944/945

DELPHINIUM BITERNATUM ALKALOIDS

Tashkent KHIMIYA PRIRODNYKH SOYEDINENIY in Russian, No 1, 1978 pp 106-111
manuscript received 25 Oct 77

SALIMOV, B. T., YUNUSOV, M. S. and YUNUSOV, S. YU., Order of the Labor
Red Banner Institute of the Chemistry of Natural Products, Academy of
Sciences UzSSR, Tashkent

[Abstract] Chloroform extraction of the above-ground portion of Delphinium
biternatum Huth yielded the following alkaloids: illienseine, aconine,
delphatine, anthranoyllicoctonine, brownine, dehydrobrownine, 10-benzoyl-
brownine, 10-benzoylillienseine and 10-dehydroillienseine. The roots yielded
brownine, delphatine and delbiterine. References 10: 7 Russian, 3
Western.

SULFUR CONTAINING ALKALOIDS

Tashkent KHIMIYA PRIRODNYKH SOYEDINENIY in Russian No 1, 1978 pp 26-41
manuscript received 9 Sep 77

ARIPOVA, S. F. and YUNUSOV, S. YU., Order of the Labor Red Banner
Institute of the Chemistry of Natural Products, Academy of Sciences
UzSSR, Tashkent

[Abstract] A review covering sulfur containing alkaloids has been given. All isolated representatives of this group can be divided into two classes: alkaloids with the sulfur atom in the ring system and compounds with an acyclic sulfur substituent. The first group contains the Nuphar alkaloids, peptides and dithiolan derivatives; the second class includes derivatives of thioxazolidone, urea and thiourea. For each representative group, chemical and spectral properties have been reviewed; an attempt was made to develop structure-activity relationship. Figure 1, references 44: 8 Russian, 6 Polish, 30 Western.

Analytical Chemistry

USSR

UDC 543.271.2(048.2)

CURRENT INSTRUMENTS FOR MEASURING GASEOUS CONTAMINENTS IN THE ATMOSPHERE

Kiev KHIMICHESKAYA TEKHNLOGIYA in Russian No 6, Nov-Dec 77 pp 10-17

Vasil'yeva, N. L. and Gozhenko, N. A.

[Abstract] A survey on the title topic covers the following basic types of analytical techniques: non-dispersive infrared optical-acoustic, best suited for CO, also suited for hydrocarbons (HC); UV filter, suitable for SO₃, NO₂ and O₃; infrared filter, suitable to CO, HC; chemiluminescence, best suited for NO₂, NO_x and CO; fluorescence, suited for SO₃; flame photometry, best suited for SO₃, NO_x and O₃; coulombometric and potentiometric, best suited for SO₃, H₂S and NO₂, also suited for CO and O₃; conductometric, suited for SO₃, total S and NO₂; flame ionization best suited for HC; and gas chromatography, best suited for HC, also suited for SO₃ and H₂S. Each technique is evaluated in terms of the usable range, the minimum detection limited, the precision, sampling and analysis time. Consideration is given to potential developments of future analyzers, particularly the microminiaturization and combination with computers. References 35: 16 Russian, 19 Western.

USSR

UDC 613.63:546.45]-074

A RAPID METHOD FOR CONTROLLING CONTAMINATION OF AIR WITH BERYLLIUM ON INDUSTRIAL PREMISES

Moscow GIGIYENA TRUDA in Russian No 12, Dec 77 pp 55-56 manuscript received 15 Jan 76

MORDBERG, YE. L. and FIL'KOVA, YE. M.

[Abstract] A rapid method has been developed for the determination of beryllium levels in air based on a colorimetric reaction of beryllium with chromazurol S. The air is passed through a filter paper impregnated with the color reagent. After a predetermined collection period the color is developed and compared with a calibration curve. This method is not very accurate, the measurement error running as high as 40-60%, but it is rapid and could possibly be used in preliminary surveys. References 2: both Russian.

USSR

UDC 614.48:658.562:615.287.5.074

QUALITATIVE DETERMINATION OF CHLOROPHOS ON TREATED SURFACES

Moscow GIGIYENA I SANITARIYA in Russian No 10, 1977 pp 85-86

KHOROZHANSKAYA, F. P., Leningrad Municipal Disinfection Station

[Abstract] A rapid test was devised for the qualitative detection of chlorophos on treated surfaces. The surface is swabbed with a cotton applicator wetted with a solution consisting of 3 volumes of 0.5% NaOH and 2 volumes of 3% H₂O₂, followed by the addition of 3-4 drops of 0.5% dimethylbezidine in acetone solution. A positive result is indicated by the swab turning an orange color which reaches maximum intensity in 2-3 min. The test was found to be effective in detecting chlorophos on tile, plastics, oil paint, and unstained plywood treated with 2, 3, or 4% solutions of chlorophos. References: 1, Russian.

USSR

UDC 541.183:543.422.4

SIMULTANEOUS DETERMINATION OF ADSORPTION AND IR ABSORPTION SPECTRA OF AN ADSORPTION SYSTEM

Moscow IZVESTIYA AKADEMII NAUK SSSR, SERIYA KHIMICHESKAYA in Russian No 12, Dec 77 pp 2661-2665, manuscript received 16 Jul 76

MURDMAA, K. O. and SERPINSKIY, V.V., Institute of Physical Chemistry, Academy of Sciences USSR, Moscow

[Abstract] A high vacuum installation was constructed for measurement of adsorption and simultaneous measurement of the spectrum of the same specimen. The heating of the specimen by the IR radiation (by up to 75° C) during spectral measurement causes thermal desorption, which depends on the filling factor of the sorption space. With adsorption of water vapor on NaA zeolite of over 5 mmol/g, a "fine structure" in the band of deformation oscillations of H₂O is observed in the spectrum. Figures 5, References 7: 6 Russian, 1 Eastern European.

USSR

UDC 541.183

NUMERICAL CALCULATION AND ANALYSIS OF KINETIC CURVES FOR BIPOROUS ADSORBENTS WITH LINEAR ADSORPTION ISOTHERMS. REPORT 2. ANALYSIS OF RESULTS PRODUCED

Moscow IZVESTIYA AKADEMII NAUK SSSR, SERIYA KHIMICHESKAYA in Russian, No 12, Dec 77, pp 2657-2661, manuscript received 16 Jul 76

ZOLOTAREV, P. P., KATAYEVA, L. I. and ULIN, V. I., Institute of Physical Chemistry, Academy of Sciences, USSR

[Abstract] An analysis is presented of the kinetic curves produced by the method numerical inversion of a Laplace transform for granules of a biporous adsorbent in the form of a sphere, a cylinder with impervious ends and a plate (cylinder or prism with impervious side surface). Graphs and tables of kinetic curves are presented for the adsorbents studies, plus the linear adsorption isotherms for the sphere, cylinder and plate granules with various ratios of time of diffusion relaxation in the transportation and adsorbing pores. The greatest difference in kinetic curves is observed with different ϵ for spherical granules, less for cylindrical granules, still less for plates. The absolute variation of the kinetic curves from the classical kinetic curve for monoporous adsorbent passes through a maximum at a certain value of time which increases with increasing ϵ . An analytic expression is presented for the kinetic curve of $\gamma(\tau)$ for a biporous adsorbent which is correct with various relationships between the time of diffusion relaxation with filling factors of 0 to 0.6-0.7. Figures 5, Tables 3, References 2 Russian.

USSR

UDC 677.494.744

IMMOBILIZATION OF TRYPSIN ON POLYMER CARRIERS WITH FIBROUS STRUCTURES

Leningrad ZHURNAL PRIKLADNOY KHIMII in Russian, Vol 51, No 3, Mar 78
pp 651-654 manuscript received 15 Feb 77

KHORUNZHINA, S. I., KHOKHLOVA, V. A., SHAMOLINA, I. I. and VOL'F, L. A.,
Leningrad Institute of Textile and Light Industry

[Abstract] Immobilization of enzymes on solid carriers increases their stability and permits their repetitive use. In this study, trypsin was immobilized on hydrophilic polyvinyl alcohol fibers (PVA). The PVA fibers are just as reactive as the more commonly used cellulose fibers, but surpass the latter by their physical and chemical properties. Introduction of the active trypsin groups onto the polymer was done by treatment of the fiber either with 2, 4, 6-trichloro-S-triazine, 2-(3-aminophenyl)-1, 3-dioxolane, or with 4-nitrobenzyl chloride. The trypsin immobilized in this manner showed 5-20% relative activity. The active groups could also be introduced into the fibrous structure of the polymer by treating the PVA fibers with maleic dialdehyde or with tribromoacetaldehyde. When optimal conditions are enforced in this process, the following quantities of trypsin may be immobilized: on maleic dialdehyde treated PVA fibers - 48.5 mg/g with 39.5% activity, and on the tribromoacetaldehyde treated PVA fibers - 27 mg/g with 26.8% activity. Figures 2, references 11: 3 Russian, 8 Western.

USSR

UDC 541.138

PERFORMANCE ANALYSIS OF THE HYDROGEN-OXYGEN FUEL CELL UNDER CONDITIONS OF SELF-CONTROLLED EXTERNAL HUMIDITY EXCHANGE. 2.

Moscow ELEKTROKHIMIYA in Russian Vol 14, No 3, Mar 78 pp 361-368

VOL'FKOVICH, YU. M., Institute of Electrochemistry, Academy of Sciences USSR, Moscow

[Abstract] The methodology for the calculation of internal and external mass exchange in the hydrogen-oxygen fuel cell has been reported. Analysis of the performance of such elements was partially reported. This is a continuation of this project, a report being given on theoretical analysis of the performance of fuel cells under conditions of an absence of external control of the removal rate of water vapor. Both the isothermal and nonisothermal work regimens have been analyzed. It has been shown that in order to extend the self-control zone, general optimization of internal and external mass exchange is required as well as the optimization of heat exchange in the fuel cell. Figures 7, references 12: 10 Russian, 2 Western.

USSR

UDC 541.138

DETERMINATION OF THE OHMIC LOSSES IN OXYGEN ELECTRODE PORES OF THE FUEL CELLS BASED ON THE GALVANOSTATIC CHARGE CURVES

Moscow ELEKTROKHIMIYA in Russian Vol 14, No 1, Jan 78 pp 27-32 manuscript received 10 Mar 76

GOLIN, YU. L., GOLINA, G. YE., PAKULINA, O. N., RYLOVA, G. V. and SHERSTOBITOV, YU. S., Sverdlovsk

[Abstract] A preliminary analysis is presented on the experimental data obtained in the process of investigating the cathodes of hydrogen-oxygen fuel cells with circulating liquid alkali electrolyte. The methodology of the determination of ohmic losses in the oxygen electrode pores was analyzed by a method based on the curve of polarization increase observed after switching on a nominal density current. In this case the unfolding curve is selected from the characteristic time t which is determined from specific surface values of the electrode and electrolyte resistance. By extrapolating to zero, the total value of the ohmic losses can be obtained. This value exceeds the losses of an ideal electrode by 15-20%; it relates only weakly to the current density and increases with the aging of an electrode. This value is very strongly associated with the gas permeability coefficient and it decreases during reductive thermal treatment of the electrode. Figures 3, references 8: 6 Russian, 2 Western.

USSR

UDC 628.543.5:[665.637.6:621.56]

INVESTIGATION OF THE POSSIBILITIES OF PURIFYING SEWAGE CONTAMINATED
WITH UKRINOL-12

Moscow NEFTEPERERABOTKA I NEFTEKHIMIYA in Russian No 9, 1977 p 19
manuscript received 15 Sep 76

RAILKO, Z. A., VASILENKO, G. D., BEGA, Z. T., FTOMOV, A. S. and TIKHONRUK, I. F.

[Abstract] Sewage contaminated with the lubricating collant Ukrinol-12 can be purified by the biological method after a lengthy adaptation period of the active slurry towards this impurity.

Initially the concentration of the impurity should not be higher than 0.05%; after the adaptation levels of up to 0.3% of the cantaminant can be taken care of. The tests were performed on laboratory scale, using the continuous process. No references.

USSR

UDC 613.6-07(47+57)

PROBLEMS OF HYGIENE STANDARIZATION OF UNDESIRABLE CONDITIONS IN THE INDUS-
TRIAL SECTOR OF THE USSR

Moscow GIGIYENA I SANITARIYA in Russian No 11, 1977 pp 42-46 manuscript
received 19 Apr 77

IZMEROV, N. F., Professor, and KORBAKOVA, A. I., Institute of Labor Hygiene and Occupational Diseases, Academy of Medical Sciences of the USSR, Moscow

[Abstract] Principles and methods for hygiene standards have been established. Amounts of noise and vibration are easily measurable; the possibility of evaluating biological effects give us opportunities to set optimal weekly or daily doses. Standards exist for all radio-frequency exposures; however, further study and refinement of standards are necessary for electromagnetic radio waves. Ionizing radiation is regulated by amount and length of exposure; the standards reflect data from laboratory animals and man. Environmental conditions such as temperature, humidity, and air movement have also been standardized. For many chemical and physical factors, experimental data (from animals and volunteers) and clinical statistical methods (reflecting health conditions of workers) are used to formulate standards. The importance of obtaining clinical statistical data from healthy workers is stressed; such data are used to estimate maximum permissible concentrations of chemicals in the air. L. E. Milkov has developed mathematical models for estimating optimal levels of chemicals in work conditions. Studies are being done on adaptation of the organism to environmental factors.

USSR

UDC 614.71(47+57)

HYGIENE OF THE ATMOSPHERE IN THE USSR

Moscow GIGIYENA I SANITARIYA in Russian No 11, 1977 pp 26-29 manuscript received 8 June 77

BUSHTUYEVA, K. A., Central Institute for the Advanced Training of Physicians, Moscow

[Abstract] Soviet research on air purity was being conducted by the late 1920's, with regular scientific meetings on this subject beginning in 1935. In 1949 a resolution of the Council of Ministers, "Measures of Combatting Atmospheric Air Pollution and Improving the Sanitary-Hygiene Conditions of Populated Areas," required industrial ministries to take measures to protect the atmosphere. The tasks of the Minister of Public Health of the USSR were defined in this regard, including the setting of maximum permissible concentrations for pollutants. In the 1960's standards for more than 100 air pollutants had been set, both in isolated circumstances and in cases where pollutants were combined. A session of the Supreme Soviet of the USSR in Sept. 1972 concerned itself with improving environmental conditions. Technological developments in the quantity and quality of industry has endangered air purity in the last 20 years; changes require new data and research in the field of air sanitation. Experiments on the biological effects of air pollutants have increased, especially with aerosols of metals. Combined efforts of hygienists and practicing physicians are recommended. Increased effectiveness in air quality investigations and broadening the base of air purification efforts are urged. References 3: Russian.

USSR

UDC 628.543.2

PROCESS FOR THE PURIFICATION OF WASTE WATER, CONTAMINATED WITH GREASE

Kiev KHIMICHESKAYA TEKHOLOGIYA in Russian No 6, Nov-Dec 77 pp 21-22

Blagodarnaya, L. F., Kaliniychuk, Ye. M., Seliverstov, A. A. and Makarov, I. A.

[Abstract] The water requiring purification is a complex and very stable emulsion of mineral oil in water stabilized by sodium salts of fatty acids and other surface active compounds. The new process consists of acidifying the waste water to a pH of 1-2, then adding the coagulant ferrous sulphate ($\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$) and calcium oxide (CaO). Upon standing, the water separates into three layers: the upper layer containing the mineral oil, in which different water insoluble organic compounds are dissolved and

dispersed; the middle aqueous layer, containing mineral salts and some organic compounds; the lower layer, containing the ferrous iron precipitate and the calcium soaps of the higher organic acids. The purification of the water was monitored with the following parameters: the chemical oxygen demand, which decreased from a range of 40,000 to 118,000 down to 3300 to 7200 mg/liter oxygen; the ether extractable material, which decreased from around 30,000 mg/liter to about 1000 mg/liter; the surface active compounds, which decreased from about 1000 mg/liter to about 60. The upper organic layer can be recovered, de-watered and recycled. References: 2 Russian.

USSR

UDC 614.777:628.312:66

Review of Book By YA.M Grushko, VREDNYYE ORTANISHESKIYE SOYEDINENIYA V PROMYSHLENNYKH STOCHNYKH VODAKH (Toxic Organic Compounds in Industrial Waste Waters), Moscow, "Khimiya", 1976, 128 pp

Moscow GIGIYENA I SANITARIYA in Russian No 12, 1977 p 99

MASLOV, L. M., Professor, and BORODIN, K. A., Reviewers, Omsk

[Abstract] This book on sanitary protection of water reservoirs consists of two parts--a general part of 12 pages and a specialized section of 107 pages. The former deals largely with general aspects of preventing water pollution and detection of toxic materials, whereas the latter concentrates on individual toxic agents, a total of 199 agents or their groups. Problems pertaining to water purification and the effectiveness of various method are also covered. The book is, however, marred by a number of shortcomings which include misunderstandings of GOST standards and the fact that not all the listed references are actually used in the text.

USSR

UDC 613.48:658.383.4:614.78

SUBSTANTIATION OF ACCEPTABLE LEVELS OF RADIOACTIVE CONTAMINATION OF WORK CLOTHES

Moscow GIGIYENA I SANITARIYA in Russian No 10, 1977 pp 42-46

SHCHERBAKOV, V. L., Candidate of Medical Sciences (CMS), and KOROSTIN, A. S., CMS, Moscow

[Abstract] Working apparel were examined for radioactive contamination coming from aerosols or by direct contact to establish acceptable safe levels for workers. Secondary contamination in the working area--air and various objects--by the contaminated clothing was accounted for. The results showed that the level of permissible contamination for cotton work clothes is 4 alpha particles/(cm² x min) for highly radioactive substances containing alpha emitting isotopes, 20 alpha particles/(cm² x min) for less active alpha emitters, and 100 beta particles (electrons)/(cm² x min) for substances containing beta activity. The corresponding levels for work clothes made of impermeable materials were established at 50 alpha particles/(cm² x min), 200 alpha particles/(cm² x min), and 4000 beta particles/(cm² x min), respectively. Tables 1; References: 5 Russian.

USSR

UDC 613.632.4:621.43.019.9:655.44]-074

SELECTION OF OPTIMAL CONDITIONS FOR THE SAMPLING OF EXHAUST GASES FROM AUTOMOBILES EQUIPPED WITH GAS TURBINE ENGINES FOR THE DETERMINATION OF BENZ(a) PYRENE

Moscow GIGIYENA I SANITARIYA in Russian No 2, Feb 78 pp 70-72 manuscript received 1 Mar 78

VYSHINSKIY, N. N., LIOGON'KAYA, T. I. and KOPYLOV, V. YE., Scientific Research Institute of Chemistry at the Gor'ki University Imeni N. I. Lobachevskiy

[Abstract] Several filters were tested in respect to their ability to trap bena(a)pyrene. On the basis of experimental data one system was markedly superior to others. This system included a sitall filter - a porous, permeable filter from AD-85 glass, resistant to the action of corrosive substances and elevated temperatures. Figures 5, one Russian reference.

USSR

UDC 614.37:678]:628.165

HYGIENIC EVALUATION OF POLYMER MATERIALS USED FOR WATER DESALINATION

Moscow GIGIYENA I SANITARIYA in Russian No 2, Feb 78 pp 11-15 manuscript received 31 May 77

SIDORENKO, G. I., SHTANNIKOV, YE. V., ROZHNOV, G. I., SELAVANOV, S. B., SOLOKHINA, T. A. and AKSENOVA, V. B., Institute of General and Community Hygiene Imeni A. N. Sysin, Academy of Medicinal Sciences USSR, Satatov Medical Institute, Saratov Scientific Research Institute of Rural Hygiene

[Abstract] Experimental results have been reported on the hygienic evaluation of a series of polymers used in water desalination operations by the method electrodialysis (ion exchange membranes) and by reverse osmosis (acetylcellulose and polyamide membranes). The studies included the effect of polymers on the organoleptic properties of water, determination of physical and chemical properties, and of the effect of possible impurities on warm blooded animals. The results obtained indicated possible leaching of organic material from the polymers into the water to the point of affecting the taste and physical properties of the water. With introduction of new materials into water supply systems, one should always be alert that possibly toxic agents may be introduced into the system. Two Russian references.

USSR

UDC 613.632.4:[669.228.7+669.248.2]:628.83

INVESTIGATION OF AIR DISCHARGES FROM GALVANIC PRODUCTION

Moscow GIGIYENA I SANITARIYA in Russian No 2, Feb 78 pp 108-110 manuscript received 4 Feb 77

VASILEVSKAYA, L. S., BOLOTOVA, G. I. and KULIKOVA, T. I., State Scientific Research Institute of Industrial and Sanitation Purification of Gases, Moscow

[Abstract] The air aspirated from the working zones of electrochemical galvanization processes was analyzed in an attempt to correlate the degree and type of contamination with particular equipment and technology used. All of the processes checked out in this analysis emitted toxic materials into the immediate surroundings. The contaminants consisted of the chemical reaction products, of evaporated particles of the electrolytes and of droplets of the liquids splashed out of the vats. The amount of the material emitted into the air related first of all to the surface of the galvanization vat, then to the type of chemical reaction used in the process, concentration of the electrolyte and the temperature of the process. One Russian reference.

USSR

UDC 614.73-07

DETERMINATION OF THE RADIOACTIVITY CATEGORIES IN LIQUID WASTES

Moscow GIGIYENA I SANITARIYA in Russian No 2, Feb 78 pp 107-108
manuscript received 9 Feb 77

RODIONOVA, L. F., Leningrad Scientific Research Institute of Radiation Hygiene, Public Health Ministry RSFSR

[Abstract] As a rule, radioactive wastes are not segregated by the levels of their radioactivity. A point has been made of the fact that various countries approached this problem completely randomly, designating different values for the "low", "medium" and "high" levels of radioactive wastes. It has been recommended to use the international standard No. 101-70 in setting up a new set of regulations for radioactive wastes. References 2: 1 Russian, 1 Western.

USSR

UDC 614.71/.73:613.16

EXPERIENCE GAINED IN STUDYING THE EXTENT OF ATMOSPHERIC POLLUTION IN CONNECTION WITH METEOROLOGICAL CONDITIONS

Moscow GIGIYENA I SANITARIYA in Russian No 2, Feb 78 pp 95-97
manuscript received 15 Mar 77

VOROB'YEVA, A. I., BORDOVSKAYA, L. I. and BAKHTIYAROV, V. G., Tomsk Medical Institute, Institute of the Atmospheric Optics, Siberian Branch of the Academy of Sciences USSR, Tomsk University

[Abstract] Air sampled in three locations around Tomsk was analyzed for a number of chemical contaminants. During the winter months there were more days with high atmospheric pollution than during the summer months. Conversely, there were more days with lower than normal air pollution during the warm season. The meteorological and aerological data for these days of lower and higher air contamination was analyzed, showing that the high levels of air pollution occur with the formation of low gradient baric field over Tomsk, either of the cyclonic or anti-cyclonic type. One Russian reference.

USSR

EFFECT OF NITROGEN FERTILIZERS ON THE YIELD OF WINTER WHEAT GROWN IN THE SEMI-ARID ZONE OF THE STEPPE

Moscow AGROKHIMIYA in Russian No 11, Nov 77 pp 28-31 manuscript received 21 Dec 76

MOKRIYEVICH, G. L. and AGAFONOVA, L. N., Don Region Agricultural Institute

[Abstract] Results of field studies concerning the effect of nitrogen fertilizers on the yield of winter wheat were reported. The effectiveness of nitrogen fertilizers depends to a large degree on the supply of water. The fertilizer applied in autumn gave a better development of plants. Spring fertilization was effective only with adequate irrigation or natural precipitation in the April/May period. As a rule, without sufficient water, the spring fertilization was not as effective as the autumn application. References 6: all Russian.

USSR

EFFECTIVENESS OF SPRING SUPPLEMENTAL FERTILIZATION OF WINTER RYE WITH NITROGEN ON SANDY TURF-PODZOL SOILS IN BRYANSKOYE POLES'YA

Moscow AGROKHIMIYA in Russian No 11, Nov 77 pp 32-39 manuscript received 25 Dec 75

TULIN, S. A., Novozybkovskaya Experimental Station, Bryanskaya Oblast'

[Abstract] Under conditions of the sandy turf-podzolic soil of Bryanskoye Podles'ya, spring application of N_{aa} nitrogen fertilizer as a supplement to winter rye fertilization gave better results than N_M . This was due to the elevation of the average daily temperature of the soil surface. Therefore, such a fertilization was best done shortly after the disappearance of snow. The N_{aa} was applied about a week later, when the first signs of spring growth renewal were noted. The optimal dose of N_{aa} for spring supplemental feeding of winter rye was 60 kg per hectare. References 42: 33 Russian, 4 Polish, 5 Western.

USSR

UDC 631.82:633.11:(571.54)

EFFECT OF MINERAL FERTILIZERS ON THE YIELD OF SPRING WHEAT GROWN IN THE STEPPE ZONE OF BURYATSKAYA ASSR

Moscow AGROKHIMIYA in Russian No 11, Nov 77 pp 74-78 manuscript received 25 Aug 76

LAPUKHIM, T. P., ANIKST, D. M. and KOREN'KOV, D. A., Buryatskaya Republic Agrochemical Laboratory, Ulan-Ude

[Abstract] This investigation concerned the effectiveness of increased doses of nitrogen fertilizer applied on spring wheat fields, as compared to varying backgrounds of phosphorus and phosphorus-potassium fertilization. Nitrogen fertilizer appeared to be highly effective on the experimental fields. Satisfactory results were obtained from the interaction of nitrogen and phosphorus under conditions of sufficient irrigation. Nitrogen increased the content of protein and gluten in the grain. Without nitrogen the effect of phosphorus and potassium was negligible. References 24: all Russian.

USSR

UDC 631.84:633.11

EFFECT OF VARIOUS NITROGEN FERTILIZER FORMS ON WINTER WHEAT GROWN ON TURF-PODZOLIC SOIL EXPRESSED AS A FUNCTION OF THE SCHEDULE OF APPLICATION

Moscow AGROKHIMIYA in Russian No 11, Nov 77 pp 22-27 manuscript received 5 Dec 76

YANISHEVSKIY, F. V., KUZ'MENKOV, A. V. and KACHALKINA, T. P.

[Abstract] The yield of wheat showed no difference that could be related to the various forms of nitrogen fertilizers when they were applied prior to seeding, in the late autumn or in early spring. Urea applied in late autumn and early spring was as effective as nitrogen fertilizer N^{aa}. Spring fertilization of the PPG-186 wheat was the most effective, while the Mironovskaya 808 exhibited better results with pre-seeding and autumn supplements. The soil acidity was directly related to the acidity of systematically used nitrogen fertilizers. The content of easily hydrolyzable nitrogen did not depend on the form of the fertilizer used. The Mironovskaya 808 brand appeared to absorb the N, P₂O₅ and K₂O fertilizers much more effectively than any other brand. References 11: all Russian.

USSR

UDC 615:547.552.43+564.307(088.8)

NOVEL BIOLOGICALLY ACTIVE THIOCARBAMIDES AND THIOCARBAMATES

Tashkent UZBEKSKIY KHIMICHESKIY ZHURNAL in Russian, No 1, 1978 pp 37-41
manuscript received 11 Jul 76

MAKHSUMOV, A. G., IBRAGIMOV, KH. P., ABIDOVA, S. and BOLTABAYEV, U.A.,
Tashkent Polytechnical Institute, Tashkent Medical Institute

[Abstract] Organic isothiocyanates are of considerable interest because of their reactivity; they serve as intermediate products in many syntheses. A number of carbamides and carbamates has been synthesized and their biological properties were studied. N-benzoylaminothiocarbamides were obtained by reacting piperidine, 2, 3, 4-methylenepiperidine, 2-methyl-5-ethylpiperidine, morpholine and decahydroquinoline with benzoylisothiocyanate and with methylenedithioisocyanate. Methylene-bis-aminothiocarbamides were synthesized from secondary heterocyclic amines and methylenedithioisocyanates. To obtain methylene-bis-aminodithiocarbamates, N-thiols of secondary heterocyclic amines were reacted with methylenedithioisocyanates. Finally, N-benzoylphenylthiocarbamates were obtained by the reaction of o-, m- and p-nitrophenols, p-iodophenol and 2,4-dichlorophenol with benzoylisothiocyanates. The bacterial activity of these compounds was studied. References 13: 7 Russian, 6 Western.

USSR

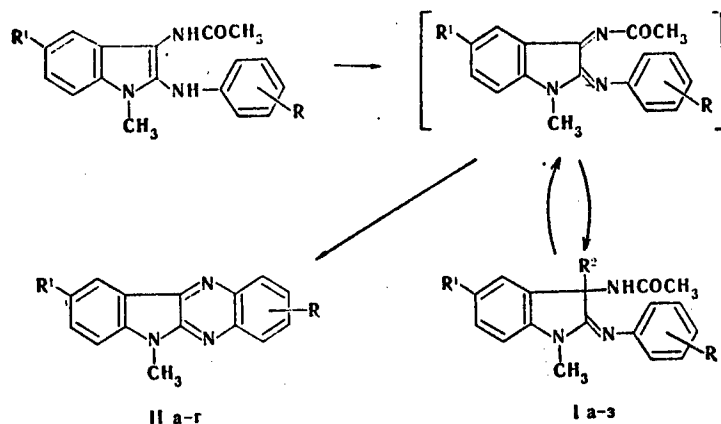
UDC 547.754'863.07:543.422.25

SOME TRANSFORMATIONS OF 2,3-DIAMINOINDOLE DERIVATIVES. THE SYNTHESIS OF
INDOLE 2,3-6 QUINAZINES

Riga KHIMIYA GETEROTSIKLICHESKIKHSOYEDINENIY in Russian No 12 1977,
pp 1645-1647 manuscript received 28 Dec 76

Kurilo, G. N., Rostova, N. I., Cherkasova, A. A. and Grinev, A. N., All-
Union Scientific Research Chemical Pharmaceutical Institute im. S.
Ordzhonikidze, Moscow

[Abstract] The compound 1-methyl-2-aryl-amino-3-acetylaminindole can be oxidized with oxygen in the presence of copper acetate in methanol to form the anil's of the 1-methyl-3-methoxy-3-acetylaminooxyindoles. If the oxidation is carried out in dimethylformamide in the presence of piperidine, the anils of 1-methyl-3-diperidino-3-acetylaminooxyindole are formed as shown on the next page.



The reaction proceeds through an intermediate, the substituted diimine of 1-methylisatine (TN: 2,3-indole followed by the addition of methanol or piperidine across the C=N at position three. When the reaction is heated to 200-210°C, the type I compounds undergo cyclization to the corresponding indolo [2,3-6] quinoxalines (type II compounds). Eight compounds having the following combination of R, R₁, and R₂ substituents were examined: H, H, OCH₃; H, CH₃, OCH₃; o-CH₃, H, OCH₃; p-CH₃, CH₃, OCH₃; p-Cl, H, OCH₃; p-COOC₂H₅, H, OCH₃; H, H, piperidine; p-Cl, H, piperidine. Syntheses are given for the individual compounds; the structures were confirmed with elemental analysis and IR, NMR and mass spectrometry. References: 1 Russian, 1 Western.

USSR

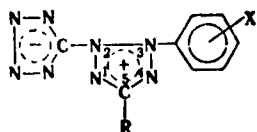
UDC 547.796.1:543.253

TETRAZOLE DERIVATIVES. XVII. POLARIGRAPHIC REDUCTION OF 2-(TETRAZOLYL-5)-3-ARYL-5 (ALKYL)ARYLTETRAZOLIUM BETAINES

Riga KHIMIYA GETREROTSIKLICHESKIKH SOYEDINENIY in Russian No 12, 1977
pp 1686-1690 manuscript received 25 Oct 75

Zabolotskaya, A. I., Shchipanov, V. P., Tyumen Industrial Institute, Tyumen

[Abstract] Nineteen compounds having the general structure given on the next page were investigated in this study.



I-XIX

These compounds, containing heteroatomic substituents at the N_2 position, are frequently unstable towards hydrolytic cleavage of the exocyclic C-N bond. The depolarization of these compounds occurs in three irreversible electro-chemical stages. During the first stage, a two-electron reduction to the di-anion of formazane occurs without the involvement of protons. Further reduction occurs with the consumption of H^+ ions. A comparison of the respective $E_{1/2}$ values (half waves) of the different compounds indicates that substituents having electron-donor capabilities make the reduction more difficult. References 11: 9 Russian, 2 Western.

USSR

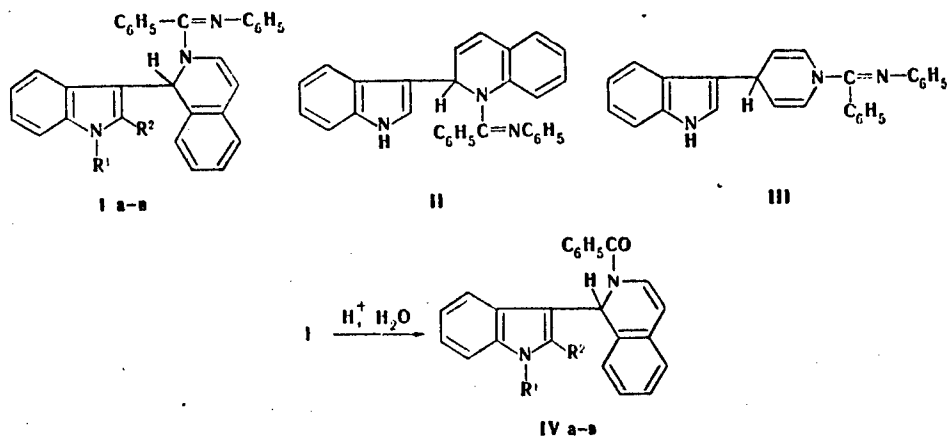
UDC 547.283.3:752.821.831.833

HETEROARYLATION OF INDOLES OF THE N-HETEROAROMATIC BASES IN THE PRESENCE OF IMIDOYLHALOGENS

Riga KHIMIYA GETREROTSIKLICHESKIKH SOYEDINENIY in Russian (Chemistry of Heterocyclic Compounds) No 12 1977 p 1694 manuscript received 5 Jul 1977

Sheynkman, A. K., Zemskiy, B. P., Babenko, M. D. and Marchtup, V. P., Donetsk State University, Donetsk

[Abstract] N-heteroaromatic base radicals may be introduced into the indol ring by the simultaneous reaction on the indols of these compounds and the acylating agent B-halogen vinyl ketones and also of acid amides and $POCl_3$. The reaction of N-phenylbenzimidoyl chloride with isoquinoline, pyridine or some other N-heteroaromatic bases, or indols results in the formation of indolylimidoyl heterocyclic compounds of types I-III.



I, IV a $R^1=R^2=H$; 6 $R^1=H$, $R^2=CH_3$; a $R^1=CH_3$, $R^2=H$

Subsequent acid hydrolysis results in compounds of type IV. Conditions and yields for the synthesis of the compounds are given and structures were confirmed by chromatography and elemental compositions. References 3: 1 Russian 2 Western.

USSR

UDC 542.958.1:547.1'118

NITRATION OF ALKENYL PHOSPHONATES WITH NITROGEN TETROXIDE

Moscow IZVESTIYA AKADEMII NAUK SSSR, SERIYA KHIMICHESKAYA in Russian No 12, Dec 77 pp 2787, manuscript received 26 Feb 77

ZHIDKOVA, L. A., BARANOV, G. M., MASTRYUKOVA, T. A. and PEREKALIN, V.V., Institute of Hetero-Organic Compounds, Academy of Sciences, USSR, Moscow; Leningrad Pedagogic Institute imeni A. I. Gertsen

[Abstract] The authors synthesize O, O-dialkyl-1-oxy-2-nitroethylphosphonates by nitration of alkenyl phosphonates with N_2O_4 in CH_2Cl_2 at room temperature. After removal of the solvent, the reaction mixture contains crystalline organophosphorus nitroalcohols plus a resinous colored product, from which individual substances could not be separated even by column chromatography. The IR spectra of the nitroalcohols produced are similar to adducts synthesized earlier from nitroalkanes and acylphosphonates. References 8: 2 Russian, 6 Western.

USSR

UDC 542.91:547.1'118:547.422

REACTION OF SECONDARY PHOSPHINES WITH OLEFINE OXIDES

Moscow IZVESTIYA AKADEMII NAUK SSSR--SERIYA KHIMICHESKAYA in Russian No 2, Feb 78 pp 473-474 manuscript received 27 May 77

PUDOVIK, A. N., ROMANOV, G. V. and POZHIDAYEV, V. M., Institute of Organic and Physical Chemistry Imeni A. Ye. Arbuzov, Kazan' Branch of the Academy of Sciences USSR

[Abstract] Diphenylphosphine reacted with symmetric olefine oxides yields β -hydroxyalkyldiphenylphosphine oxide. The reaction of secondary phosphines with propylene oxide yields α -hydroxyisopropylphosphine oxides. The ratio of the phosphine to oxides is 1:2 and the reaction is carried out by heating the reagents in sealed ampules. References 2: 1 Russian, 1 Western.

USSR

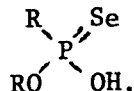
UDC 542.91:541.6:547.1'118

SYNTHESIS AND STRUCTURE OF O-ALKYLALKYLSELENOPHOSPHONIC ACIDS AND THEIR SALTS

Moscow IZVESTIYA AKADEMII NAUK SSSR--SERIYA KHIMICHESKAYA in Russian No 2, Feb 78 pp 437-440 manuscript received 16 Nov 76

NURETDINOV, I. A., BUINA, N. A., BAYANDINA, YE. V., LOGINOVA, E. I. and GINIYATULLINA, M. A., Institute of Organic and Physical Chemistry imeni A. Ye. Arbuzov, Kazan' Branch of the Academy of Sciences USSR

[Abstract] When heated in benzene, elemental selenium adds to o-alkylalkylphosphonites in the presence of cyclohexylamine to form the cyclohexylammonium salts of o-alkylalkylseleniumphosphonic acid $[R(RO)P(Se)OH]$. Treatment with HCl liberates the acid itself. On the basis of IR and NMR (^{31}P and 1H) data, the following structure was proposed for the acid:



The acid reacts with alkali metal amines, alkoxides, hydrides and hydroxides forming respective salts. Figures 2, references 9: 2 Russian, 4 Polish, 3 Western.

USSR

UDC 542.91:547.1'118

SYNTHESIS OF AMINOSUBSTITUTED α -HYDROXYALKYLIDENEBISPHOSPHONIC ACIDS AND THEIR ACID-BASE AND COMPLEXING PROPERTIES

Moscow IZVESTIYA AKADEMII NAUK SSSR--SERIYA KHIMICHESKAYA in Russian No 2, Feb 78 pp 433-437 manuscript received 4 Nov 76

KABACHNIK, M. I., MEDVED', T. YA., DYATLOVA, N. M., POLIKARPOV, YU. M., SHCHERBAKOV, B. K. and BEL'SKIY, F. I., Institute of Metal Organic Compounds, Academy of Sciences USSR, Moscow

[Abstract] A series of aminosubstituted α -hydroxyalkylidenebisphosphonic acids has been synthesized (N-ethyl, N,N-diethyl and N,N-dimethyl derivatives). The acid dissociation constants for these compounds and the stability constants of their complexes with Ca^{2+} , Co^{2+} and Cu^{2+} were determined. These compounds show a rather high pK_1 and pK_3 values in comparison to the pK of the dissociation of aminophosphonic acids. These new acids are capable of forming complexes in neutral and acid pH range. References 11: 8 Russian, 3 Western.

USSR

UDC 541.67:547.314

DIPOLE MOMENTS OF ORGANOPHOSPHORUS COMPOUNDS. COMMUNICATION 15. POLARITY AND POLARIZABILITY OF SOME ACETYLENE COMPOUNDS

Moscow IZVESTIYA AKADEMII NAUK SSSR--SERIYA KHIMICHESKAYA in Russian No 2, Feb 78 pp 359-363 manuscript received 22 Dec 76

ISHMAYEVA, E. A., VERESHCHAGIN, A. N., KHUSAINOVA, N. G., BREDIKHINA, Z. A. and PUDOVIK, AN. N., Institute of Organic and Physical Chemistry imeni A. Ye. Arbuzov, Kazan' Branch of the Academy of Sciences USSR: Kazan' State University imeni V. I. Ul'yanov-Lenin

[Abstract] Dipole moments were measured for a series of acetylene organophosphorus compounds of the general formula $\text{R}_2\text{P}(\text{O})\text{C}=\text{CR}_1\text{R}_2$, R_1 and R_2 (in solvent) having been reported: C_2H_5 , CH_3 , 4.59 (CCl_4); C_6H_5 , CH_3 , 4.48 (CCl_4); Cl , CH_3 , 3.92 (CCl_4); $\text{C}_2\text{H}_5\text{O}$, H , 3.86 (C_6H_6); $\text{C}_2\text{H}_5\text{O}$, CH_3 , 3.69 (CCl_4); $\text{C}_2\text{H}_5\text{O}$, Cl , 3.54 (C_6H_6). It has been established that the gosh-orientation of the phosphoryl and ethoxy groups is predominant in O, O-diethylethynyl- and O,O-diethylpropynylphosphonates. A gosh-orientation of the $\text{C}-\text{CH}_3$ ethyl and phosphoryl groups was assigned in the diethylpropynylphosphine oxide. In the case of the diphenylpropynylphosphine oxide, a structure has been proposed in which the planes of the phenyl groups was obstructing the ethynyl groups. It has been found that the reactivity of diethylpropynylphosphine oxide was about the same as that of the O,O-diethylpropynylphosphonate. This could not be explained by the electron

effects only; evidently steric factors had to be responsible for this phenomenon. Figures 3, references 18: 14 Russian, 4 Western.

USSR

UDC 542.91:547.1'118

SYNTHESIS OF O,O-DIALKYL-S-LUPINANETHIOPHOSPHATES, O,O,-DIALKYL-S-EPILUPINANE-THIOPHOSPHATES AND THEIR METHYL IODIDES

Moscow IZVESTIYA AKADEMII NAUK SSSR--SERIYA KHIMICHESKAYA in Russian No 2, Feb 78 pp 480-482 manuscript received 20 Jun 77

DALIMOV, D. N., ABDUVAKHABOV, A. A., ASLANOV, KH. A. and GODOVIKOV, N. N., Institute of Metalorganic Compounds, Academy of Sciences USSR, Moscow; Department of Bioorganic Chemistry, Academy of Sciences UzSSR, Tashkent

[Abstract] A series of title compounds has been synthesized by reacting bromulupinane or bromoepilupinane with potassium dialkylthiophosphates. Their physical properties have been tabulated. No biological activity has been reported. References 4: all Russian.

USSR

UDC 541.67:541.63:547.245:547.1'118

DIPOLE MOMENTS OF ORGANOPHOSPHORUS COMPOUNDS. COMMUNICATION 16. INVESTIGATION OF THE CONFORMATIONS OF TRIMETHYLSILYL GROUPS IN SOME PHOSPHITS, PHOSPHATES AND PHOSPHONATES

Moscow IZVESTIYA AKADEMII NAUK SSSR--SERIYA KHIMICHESKAYA in Russian No 2, Feb 78 pp 363-369 manuscript received 10 Nov 76

VARNAVSKAYA-SAMARINA, O. A., ISHMAYEVA, E. A., ROMANOV, G. V., NAZMUTDINOV, R. YA, REMIZOV, A. B. and PUDOVIK, A. N., Institute of Organic and Physical Chemistry imeni A. Ye. Arbuzov, Kazan' Branch of the Academy of Sciences USSR, Kazan' State University imeni V. I. Ul'yanov-Lenin

[Abstract] Rotational isomerism around the P-X bond has been studied in tri- and tetracoordinated phosphorus compounds with alkyl groups attached at the X. In this study the spacial structure of the organophosphorus compounds with the following structures: $[(CH_3)_3SiO]_3P=Y$, $[(CH_3)_3SiO]_2P(Y)C_6H_5$ and $(CH_3)_3SiOP(Y)(OC_2H_5)_2$ (where Y represented an unshared apir of electrons at O, S or Se), has been investigated. The dipole moments, Kerr constants and IR spectra of these compounds were determined. Silicon

homologues of the phosphates and phosphonates studied showed a preference for cis-orientation of the $P=O$ (S, Se) and $(CH_3)_3SiO$ groups in conformational equilibrium. In compounds with tricoordinated phosphorus, the trimethylsilyl group occupies the gosh-position in respect to the unsaturated electron pair of the phosphorus atom. Figures 2, references 18: 13 Russian, 5 Western.

USSR

UDC 541.124.7:541.6:547.1'118

IONIZATION CONSTANTS AND THE STRUCTURE OF SEVEN AND EIGHT MEMBER CYCLIC DERIVATIVES OF PHOSPHOROUS ACID

Moscow IZVESTIYA AKADEMII NAUK SSSR--SERIYA KHIMICHESKAYA in Russian
No 3, Mar 78 pp 689-691 manuscript received 3 Jun 77

OVCHINNIKOV, V. V., CHERKASOVA, O. A., YARKOVA, E. G., MUKMENEVA, N. A.,
PUDOVIK, A. N. and CHERKASOV, R. A., Kazan' State University imeni
V. I. Ul'yanov-Lenin, Jazan' Chemical-Technological Institute imeni
S. M. Kirov

[Abstract] Spectral characteristics (IR and NMR- ^{31}P) and the ionization constants were determined for 4,4'-dimethyl-6,6'-di-ter-butyl-4,5,7,8-dibenzo-2-keto-2-hydro-1,3,2-dioxaphosphacinane, 4,5,6,7-dinaphto-2-keto-2-hydro-1,3,2-dioxaphosphhepane, 4,5,6,7-dibenzo-2-keto-2-hydro-1,3,2-dioxaphosphhepane and 4,5-benzo-2-keto-2-hydro-1,3,2-dioxaphosphholane. These compounds show tautomeric equilibrium. The content of the $P(O)H$ form increases in this system when the ring is increased from five to eight members. This cycle enlargement results in decreased proton donating ability of parent acids, making an eight membered ring comparable to acyclic analogues. References 10: 7 Russian, 3 Western.

USSR

UDC 541.6:547.1'13

MOLECULAR STRUCTURE OF CIS-TRIFLUOROMETHYLMERCURY-BIS(TRIPHENYLPHOSPHINE)TRIFLUOROMETHYLPLATINUM (II)

Moscow IZVESTIYA AKADEMII NAUK SSSR--SERIYA KHIMICHESKAYA in Russian No 3, Mar 78 pp 621-627 manuscript received 9 Dec 76

KUZ'MINA, L. G., STRUCHKOV, YU. T., BASHILOV, V. V., SOKOLOV, V. I. and REUTOV, O. A., Institute of Metal Organic Compounds, Academy of Sciences USSR, Moscow

[Abstract] X-ray structural analysis of $\text{CF}_3\text{HgPt}(\text{CF}_3)[\text{P}(\text{C}_6\text{H}_5)_3]_2$ shows that it has a cis-configuration. The length of the HgPt bond was found to be 2.569 Å, which is shorter than the sum of the two average radii of the atoms involved. This may be explained by the $d_{\pi} - p_{\pi}$ -interaction of the filled orbitals d_{xy} and d_{yz} of the transition metal with vacant Hg orbitals p_x - and p_y -. Figure 1, references 20: 5 Russian, 15 Western.

USSR

UDC 541.124:541.6:547.1'118

BLOCKED INTERNAL ROTATION IN A SERIES OF ALKYLPHOSPHONIC ACID DICHLORIDES

Moscow IZVESTIYA AKADEMII NAUK SSSR--SERIYA KHIMICHESKAYA in Russian No 3, Mar 78 pp 614-621 manuscript received 1 Nov 76

RAYEVSKIY, O. A., MUMSHIYEVA, B. G., ZYABLIKOVA, T. A., VERESHCHAGIN, A. N., GRITSAYEV, YE. I. and GILYAZOV, M. M., Institute of Organic and Physical Chemistry imeni A. Ye. Arbuzov, Kazan' Branch of the Academy of Sciences USSR

[Abstract] Experimental results have been reported on the spacial structure of methyl-, ethyl-, isopropyl-, isobutyl- and ter-butyl-phosphonic acid dichlorides. These results were determined by vibrational and PMR spectroscopy, by measurement of the dipole moments, and Kerr's effect. As the volume of the substituent at the α -carbon atom increases, the content of the trans-oriented conformer to the phosphoryl group is decreased. In the IR spectra doublets were noted in the 1250-1300 cm^{-1} region. Comparison of the spectra of $\text{Cl}_2\text{P}(\text{O})\text{Alk}$ and of their complexes with SnCl_4 , indicated that conformational effects are not the only cause for their appearance in the spectrum; redistribution of the electronic density in the ligand and the complex could have also been contributing factors. The interaction of unbound atoms account for the changes in the potential energy curves in the process of internal rotation relative to the P-C bond. Figures 4, references 15: 7 Russian, 8 Western.

USSR

UDC 547.241:541.49

SYNTHESIS OF IMINODIALKYLPHOSPHONIC ACIDS

Leningrad ZHURNAL ORGANICHESKOY KHIMII in Russian, Vol 14, No 1, Jan 78
pp 215-216 manuscript received 14 Mar 77

SUSHITSKAYA, T. M., TSIRUL'NIKOVA, N. V. and TEMKINA, V. YA., All-Union
Scientific-Research Institute of Chemical Reagents and Ultra Pure
Chemicals

[Abstract] A novel destruction of hydrazinedialkylphosphonic acids by means of sodium nitrite has been carried out leading to the formation of iminodimethylphosphonic and iminodiethylphosphonic acids. These compounds serve as intermediates in the synthesis of a number of organophosphorus products. Other reactions leading to the same end products were complex, requiring many steps, high temperatures and pressures. References 3: 1 Russian, 2 Western.

USSR

UDC 547.241+547.33

THE REACTION OF TRIMETHYLPHOSPHITE WITH β -NITROSTYRENE

Leningrad ZHURNAL OBSHCEY KHIMII in Russian Vol 47, No 10, Oct 77 pp 2391-2392 manuscript received 22 Jan 77

VAFINA, N. M. and SHERMERGORN, I. M., N. E. Bauman Institute of Veterinary Science, Kazan'

[Abstract] The reaction of trimethylphosphite with β -nitrostyrene in methanol, forming 2-dimethoxyphosphinyl-2-methoxy-2-phenylacetaldoxime (I) was studied in detail in various solvents and it was established that in addition to the products which might be expected upon attack of the α -carbon atom of the β -nitrostyrene by trimethylphosphite, compounds are produced which cannot be formed by the general mechanism expected. For example, in acetic acid with distillation of the reaction mixture under vacuum, dimethyl- α -styrylphosphonate, dimethyl- α -phenyl- β -nitroethylphosphonate and 1,2-bis(dimethoxyphosphinyl)phenylethane are formed. Subsequent reactions of these products are found to produce C-dimethoxyphosphinylformaldoxime. References 4: 2 Russian, 2 Western.

USSR

UDC 547.244

SYNTHESIS OF P-HALOGENILIDES

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 47, No 10, Oct 77 pp 2390-2391 manuscript received 7 Dec 76

KOLODYAZHNYI, O. I., Institute of Organic Chemistry, Academy of Sciences, Ukrainian SSR

[Abstract] It was determined that bisphenylsulfonylmethane (I) reacts with halogenphosphoranes in the presence of triethylamine to form phosphonium-ilides with halogen atoms at the phosphorus (P-halogenilides). The reaction occurs in tetrahydrofuran with slight cooling; trihalogenmethanes react smoothly and with good yield. The reaction of phosphoranes with a larger number of halogen atoms and PCl_5 is more complex due to their ability to interact with triethylamines. The structure of the ilides was confirmed by spectroscopic data.

USSR

UDC 547.26'118

INTERACTION OF DIALKYLPHOSPHITES WITH α -CHLORO- α -NITROSOALKANES IN THE PRESENCE OF BASES

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 47, No 10, Oct 77 p 2390 manuscript received 16 Jan 77

MIKHAYLIK, S. K., DUDCHENKO, T. N. and GOLOBOV, Yu. G.

[Abstract] Acid phosphites react easily with nonfluorinated α -chloro- α -nitrosoalkanes in the presence of triethylamine to form esters. The reaction occurs in ether at -40°C , yield 60-70%. References: 3 Russian.

USSR

UDC 547.26.118+547.2926

INTERACTION OF 3-COORDINATED PHOSPHORUS WITH ACETIC ACID DIACYLALS

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 47, No 10, Oct 77 p 2389 manuscript received 14 Feb 77

GAZIZOV, M. B., S. M. Kirov Institute of Chemical Technology, Kazan'

[Abstract] Chlorides of 3-coordinated phosphorus (I) react with acetic acid monoacylals (II) to form a complex mixture of products; the behavior of acetic acid diacylals (III) in similar reactions was studied. It was found that the interaction of the compounds (I) and (III) occurs under more severe conditions (150-160 C, 1.5 hours) than the earlier reaction (between I and II) and leads to the formation of α -acetoxyalkylphosphonic esters. Reference: 1 Russian.

USSR

UDC 547.26'118

SYNTHESIS OF N-ISOCYANATOFORMYL-N-ALKYLAMIDES OF DIALKYLPHOSPHORIC ACIDS

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 47, No 10, Oct 77 pp 2388-2389 manuscript received 18 Jan 77

GORBATENKO, V. I., LUR'YE, L. F. and SAMARAY, L. I., Institute of Organic Chemistry, Academy of Sciences, Ukrainian SSR

[Abstract] N-alkylamides of phosphoric acid (I) easily interact with chloroformylisocyanate when boiled in carbon tetrachloride to yield N-isocyanatoformyl-A-alkylamides if dialkylphosphoric acid (II), a new type of phosphorylated organic isocyanates. II are colorless liquids which can be distilled under a vacuum; their IR spectra contain intensive absorption bands in the area of 2260 (NCO), 1720 (C=O) and 1280 (P=O) cm^{-1} .

USSR

UDC 547.26'118

VIBRATIONS OF THE P=Se GROUP IN TRIALKYLSELENOPHOSPHATES

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 47, No 10, Oct 77 p 2388 manuscript received 23 Dec 76

TURKEVICH, V. V., MEL'NIK, Ya. I., VAS'KIV, A. P., and KOLODIY, Ya. I., L'vov State University

[Abstract] A study was made of the IR spectra of a number of trialkylphosphites and trialkylselenophosphates, trialkylthiophosphates and trialkylphosphates synthesized from them. Analysis of the experimental material indicates that one absorption band at 560-600 cm^{-1} is characteristic for the vibrations of the P=Se bond in the IR spectra. The precise position of the band depends on the nature of the atoms closest to the phosphorus and the radicals attached to it. References 5: 3 Russian, 2 Western.

USSR

UDC 541.49+541.54+547.241

THE DIPOLE MOMENTS AND ENTHALPY OF FORMATION OF COMPLEXES OF TIN TETRACHLORIDE WITH ORGANOPHOSPHORUS DONORS

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 47, No 10, Oct 77 p 2386
manuscript received 13 Dec 76

KUCHERUK, L. V., GOL'DSHTEYN, I. P., KURAMSHIN, I. Ya., GUR'YANOVA, Ye. N., and PUDOVNIK, A. N., Kazan' State University; L. Ya. Karpov Scientific Research Institute for Physical Chemistry

[Abstract] In order to compare the donor capabilities of organophosphorus compounds, the dipole moments and thermodynamic parameters of the reactions of formation of complexes $\text{SnCl}_4 \cdot \text{D}$ and $\text{SnCl}_4 \cdot 2\text{D}$ are measured, where $\text{D} = (\text{C}_4\text{H}_9)_3\text{P}$, $(\text{C}_4\text{H}_9)_3\text{O}(\text{O})$, $(\text{C}_4\text{H}_9)_3\text{P}(\text{S})$ and $(\text{C}_4\text{H}_9)_3\text{P}(\text{Se})$, allowing estimation of the dipole moments of the donor-acceptor bonds μ_{DA} . The dipole moments of the $\text{SnCl}_4 \cdot 2\text{D}$ complexes are significantly lower than those of the $\text{SnCl}_4 \cdot \text{D}$ complexes, though significantly different from zero, indicating that there is a mixture of cis and trans octahedral isomers in the solution. References: 6 Russian.

USSR

UDC 547.241

THE INTERACTION OF ETHYLMETAPHOSPHONITE WITH HYDROGEN CHLORIDE AND ACRYLIC ACID

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 47, No 10, Oct 77 p 2385
manuscript received 7 Dec 76

GAZIZOV, T. Kh., KHARLAMOV, V. A. and PUDOVNIK, A. N., A. Ye. Arbuzov Institute of Organic and Physical Chemistry, Kazan' Affiliate of Academy of Sciences, USSR

[Abstract] It has been thought that ethylmetaphosphonite (I) reacts reversibly with hydrogen chloride to form ethylphosphonous acid chloride (II). To confirm this, ethylmetaphosphonite was treated with HCl in the presence of acrylic acid chloride (III) and methacrylic acid chloride (IV). A stream of dry HCl was passed through a mixture of compounds I and III or IV in benzene at 40-50°C for 4 hours. The result was ethyl- β -chloroformylethylphosphinic acid chloride or ethyl- β -chloroformylpropylphosphinic acid chloride. The data produced can be explained by reversible reaction of ethylmetaphosphonite with HCl forming ethylphosphonic acid chloride, which then attached to an unsaturated acid chloride, forming the end products. References 3: Russian.

USSR

UDC 547.241:541.9

REGROUPING OF DIPHENYLACETONYPHOSPHINE TO DIPHENYLACETONYMETHYLENEPHOSPHORANE
UNDER THE INFLUENCE OF STANNOUS CHLORIDE

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 47, No 10, Oct 77 pp 2384-2385 manuscript received 16 Nov 76

PUDOVIK, A. N., SOBANOVA, O. B., MURATOVE, A. A., and YARKOVA, E. G.,
Kazan' State University

[Abstract] A study was made of the complex-forming capability of diphenylacetylphosphine and stannous chloride (2:1). The interaction is accompanied by regrouping to the ilid with a P-H bond, diphenylacetyl-methylenephosphorane, with subsequent formation of its adduct. The adduct is a white crystalline product with an odor characteristic for organic compounds of tin. Different results were produced upon interaction of the initial reagents in a ratio of 1:1. The white crystalline product formed $[\text{Ph}_2\text{PCH}_2\text{C}(\text{O})\text{CH}_3] \cdot \text{SnCl}_4$ does not have the specific organic tin compound odor. References 5: 2 Russian, 3 Western.

USSR

CALCULATION OF DIPOLE MOMENTS IN COMPOUNDS OF TRIVALENT PHOSPHORUS

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 47, No 10, Oct 77 pp 2224-2226 manuscript received 13 May 76

GEL'FOND, A. S., AKHMADULLINA, F. Yu. and CHERNOKAL'SKIY, B. D., S. M. Kirov
Institute of Chemical Technology, Kazan'

[Abstract] The dipole moments of molecules containing atoms with unshared electron pairs are largely determined by the moments of the unshared electron pairs (MUEP). Due to the contradictory nature of available data, the authors calculated the MUEP for the phosphorus atom in compounds of trivalent phosphorus on the basis of experimental data. The moment of the P-C(Ph) bond is significantly greater than the moment of the P-C(Ep) bond, indicating the predominance of the influence of inductive effects in E-C bonds (E-As, P). References 16: 14 Russian, 2 Western.

USSR

UDC 547.241:543.422.2

REACTION OF DIETHYLPHOSPHINOXIDE WITH MICHLER KETONE IN THE PRESENCE OF METALLIC SODIUM

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 47, No 10, Oct 77 pp 2220-2224 manuscript received 14 Oct 76

BYCHKOV, N. N., SHEMYATENOV, A. G., BOKANOV, A. I., and STEPANOV, B. I.,
D. I. Mendeleev Institute of Chemical Technology, Moscow

[Abstract] Diethylphosphinyldiethyltetramethyldiaminodiphenylmethane (I) and the corresponding benzhydrol (II) are interesting as initial substances for the synthesis of organophosphorus diarylmethane dyes. However, the literature contains no data on compounds such as I. The authors found that when Michler ketone interacts with diethylphosphin oxide and metallic sodium, bis(4-dimethylaminophenyl)methyldiethylphosphin oxide and a sodium salt of diethylphosphinic acid are formed. Figures 3, Table 1, References 9: 5 Russian, 4 Western.

USSR

UDC 547.1'3+547.241+547.233

FERROCENYLAMINOMETHYLPHOSPHONATES

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 47, No 10, Oct 77 pp 2215-2220 manuscript received 16 Jul 76

BOYEV, V. I. and DOMBROVSKIY, A. V., Chernovitsa State University

[Abstract] A description is presented of a previously unknown condensation of formyl- and acetylferrocene with a number of dialkyl esters of phosphorous acid in the presence of various primary and secondary amines. The reaction was conducted by holding the reaction mixture, consisting of equimolecular quantities of an aldehyde or ketone, dialkyl ester of phosphorous acid and amine at room temperature for 7 to 10 days. Condensation occurs in two stages, attachment of the amine to the carbonyl compound being the first. Table 1, Figure 1, References 7: 6 Russian, 1 Western.

USSR

UDC 546.18

SILYL DERIVATIVES OF OXYALKYLPHOSPHINES

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 47, No 10, Oct 77 pp 2213-2215 manuscript received 16 Oct 76

VALETDINOV, R. K., ZARIPOV, Sh. I., LEBEDEV, Ye. P., SHAKIROVA, R. Kh., D'YAKOV, V. M., and KUDYAKOV, N. M., Kazan' Affiliate of the S. V. Lebedev All-Union Scientific Research Institute of Synthetic Rubber

[Abstract] A study was made of the possibility of using hexamethyldisilazane and hexamethyldisilothiane to produce trimethylsilyl derivatives of bis (oxymethyl)-, bis (β -oxyethyl)- and bis(β -oxypropyl)alkylphosphines. Previously unknown alkylbis(trimethylsiloxyalkyl)phosphines and their oxides were synthesized by the interaction of alkylbis(oxyalkyl)phosphines and their oxides with an equimolar mixture of hexamethyldisilazane and trimethylchlorosilane or with hexamethyldisilothiane. Table 1, References 8: 6 Russian, 2 Western.

USSR

UDC 547.558.1

SYNTHESES BASED ON (p-FORMYLPHENYL)DIPHENYLPHOSPHINE

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 47, No 10, Oct 77 pp 2207-2212 manuscript received 30 Jun 76

ZHMUROVA, I. N., YURCHENKO, V. G., YURCHENKO, R. I., and SAVENKO, T. V., Institute of Organic Chemistry, Academy of Sciences, Ukrainian SSR

[Abstract] (p-Formylphenyl)diphenylphosphine ($C_6H_5)_2PC_6H_4CHO$ (I) enters reactions characteristic both for aromatic aldehydes and for tertiary phosphines. It is easily iminized by phenylazide, being transformed to (p-formylphenyl)-diphenylphosphazobenzene (II). The reactions of (I) at the nucleophilic and electrophilic centers are studied. Convenient methods are found for producing β -substituted and β, β -disubstituted (p-vinylphenyl)diphenylphosphines. Tables 2, References 10: 6 Russian, 4 Western.

USSR

UDC 547.241

HYDROLYTIC SPLITTING OF PHENYL ESTERS OF ACIDS OF PENTAVALENT PHOSPHORUS
IN THE PRESENCE OF AMINES

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 47, No 10, Oct 77 pp 2205-2207 manuscript received 23 Jul 76

FEDOROVA, G. K., KONONENKO, I. N., MOSKALEVSKAYA, L. S., and KIRSANOV, A. V.

[Abstract] The phenyl esters of phosphoric, phenyl- and styrylphosphoric acids, when heated with an excess of primary amine, undergo hydrolytic splitting at one ester group to form alkylammonium salts of the corresponding partial acid esters. The reaction can occur upon heating of the full esters with an excess of amine without the addition of water, producing yields of 50-70% of the partial esters. Examples are given. When dilute hydrochloric acid acts on the acid salts produced, the corresponding acids are produced. Table 1, References 6: 1 Russian, 5 Western.

USSR

UDC 547.26'118

α -(DIETHOXYPHOSPHONYL)- β -CHLOROETHYLISOCYANATE

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 47, No 10, Oct 77 pp 2203-2204 manuscript received 24 June 76

MIKHAYLYUCHENKO, N. K. and SHOKOL, V. A., Institute of Organic Chemistry, Academy of Sciences, Ukrainian SSR

[Abstract] α,β -Dichloroethylisocyanate reacts easily with triethylphosphite to form only monophosphorylated alkylisocyanate. The chlorine in the β position is immobile and does not enter the Arbuzov reaction with triethylphosphite. α -(Diethoxyphosphonyl)- β -chloroethylisocyanate is a colorless fluid which distills under vacuum without decomposition and is soluble in inert solvents. It gradually yellows upon long-term standing. Its structure is confirmed by IR spectroscopy. Table 1, References 2: 1 Russian, 1 Western.

USSR

UDC 547.26'118

REACTION OF THE ESTERS OF N-CHLOROCARBAMINIC ACID WITH TRIALKYLPHOSPHITES

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 47, No 10, Oct 77 pp 2202-2203 manuscript received 13 Feb 76

SHOKOL, V. A., MIKHAYLYUCHENKO, N. K. and MOLAVKO, L. I., Institute of Organic Chemistry, Academy of Sciences, Ukrainian SSR

[Abstract] A study was made of the reaction of N-chlorocarbaminic acid esters with trialkylphosphites, which is similar to the interaction of N-chloro-N-alkylcarbaminic acid esters with trialkylphosphites, forming N-(dialkylphosphono)-carbaminic acid esters, which were converted upon heating in a vacuum to isocyanates of dialkylphosphoric acids. A table of alkyl esters of N-(dialkylphosphono)carbaminic acid esters, ROCONHP(O)(OR')₂ showing R, R', yield, n_D^{22} , N found, N calculated and empirical formula is presented. Table 1, References 6: Russian.

USSR

UDC 547.879.419.1.07

ETHYLENIMINE DERIVATIVES OF 1,2,6-PHOSPHADIAZINES

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 47, No 10, Oct 77 pp 2199-2201 manuscript received 8 Apr 76

PROTSENKO, L. D., SHEVCHENKO, V. I., KORNUA, P. P., and TROKHIMENKO, I. S.

[Abstract] The authors studied the reaction between chlorine derivatives of 1,2,6-phosphadiazines and ethylenimine for the first time. It was found that this reaction occurs under mild conditions in benzene in the presence of triethylamine as a hydrogen chloride acceptor forming the corresponding ethylamine derivatives of 1,2,6-phosphadiazines. These derivatives are colorless crystals, soluble in water, alcohol, benzene, chloroform, petroleum ether and difficult in ether. Table 1, References 7: 6 Russian, 1 Western.

USSR

UDC 547.26'118

SYNTHESIS AND CERTAIN PHYSICAL-CHEMICAL PROPERTIES OF AMIDOPHOSPHATES

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 47, No 10, Oct 77 pp 2196-2199 manuscript received 9 Feb 76

BEBIKH, G. F., TROITSKAYA, L. M. and BUCHIKHIN, Ye. P., Moscow State University

[Abstract] Introduction of one, two or three amide groups to the phosphoric acid molecule has a significant influence on the distribution of electron density of heteroatoms, which should in turn lead to a change in the capability of the molecule for interaction with various functional groups for metal ions. This probably also influences the shift in absorption bands in the IR spectra of the molecules of amidophosphates. The authors studied the synthesis of amidophosphates and their properties in this connection. The spectral studies of some of the new amidophosphates synthesized indicate that as the number of the MHR group increases in the molecule, new ($\nu_{\text{P=O}}$) is displaced toward the low-frequency end. IR spectral data can be used to determine the number of PN bonds in the amidophosphate molecule, i.e., the absorption band of valent oscillations of the phosphoryl group $\nu_{\text{P=O}}$ 1180-1190 cm^{-1} is characteristic for the triamide, 1210 cm^{-1} for the diamide and 1220-1230 cm^{-1} for the monoamide. Figure 1, Table 1, References 8: 1 Russian, 7 Western.

USSR

UDC 547.495.1

SYNTHESIS AND PROPERTIES OF DIALKYL ESTERS OF N- β -CHLOROALKYL(ARYL)URETHANE-PHOSPHORIC ACID

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 47, No 10, Oct 77 pp 2184-2188 manuscript received 20 Feb 76

BAL'ON, Ya. G., MOSKALEVA, R. N. and PARANYUK, V. Ye., Kiev Scientific Research Institute for Endocrinology and Metabolism

[Abstract] Continuing their study of the properties of the esters of N- β -chloroalkyl(aryl)-N-chlorocarbaminic acid (I), the authors studied their interaction with phosphites and the properties of the compounds produced. Interaction of the alkyl esters of I with trialkylphosphites produces dialkyl esters of N- β -chloroalkyl(aryl)urethanephosphoric acids. Dialkyl esters of N- β -chloroalkyl(aryl)urethanephosphoric acids hydrolyze by splitting at the nitrogen-phosphorus bond to form alkyl esters of N- β -chloroalkyl(aryl)carbaminic acid, and the alcoholic alkali saponifies to 2-alkyl(aryl)aziridines. Tables 2, References 12: 7 Russian, 5 Western.

USSR

UDC 543.422:547.26'118

ELECTRON-DONOR PROPERTIES AND STRUCTURE OF THE ESTERS OF SUBSTITUTED BENZOYL-
PHOSPHONIC ACIDS

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 47, No 10, Oct 77 pp 2180-
2184 manuscript received 27 Feb 76

SHVETS, A. A., OSIPOV, O. A. and TOKINA, L. M., Rostov-On-Don State
University

[Abstract] Benzoylphosphonic acid esters interact with the tetrachlorides of tin and titanium to form molecular complexes with the compositions $MCl_4 \cdot E$ and $MCl_4 \cdot 2E$ (where M is a metal, E is an ester). The electron donor properties of the esters are explained by assuming $p\pi-d\pi$ conjugation. The frequency of the carbonyl absorption both in noncoordinated esters and in complexes is a linear function of the electrophilic constants of the substituents. Tables 2, References 14: 9 Russian, 5 Western.

USSR

UDC 547.26'118

KINETICS OF INVESTIGATION OF REACTIONS OF NUCLEOPHILIC SUBSTITUTION IN THE
CYCLOHEXYLPHOSPHONITES

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 47, No 10, Oct 77 pp 2178-
2180 manuscript received 19 Feb 76

D'YAKONOV, A. N., ZAVLIN, P. M. and AL'BITSKAYA, V. M.

[Abstract] Continuing their study of the reactions of nucleophilic substitution at the tricoordination phosphorus atom in cyclohexylphosphonites, the authors studied the kinetics of the reactions in question. To simplify the kinetic measurements, the reactions of symmetrical diesters and diamides of cyclohexylphosphonous acid with alcohols and amines were studied. The studies showed that the conversions in question are satisfactorily described by second order kinetic equations, while analysis of the thermodynamic parameters of activation indicates that the processes studied are bimolecular nucleophilic type $S_N2(P)$ substitution reactions. Table 1, References 3: Russian.

USSR

UDC 547.26'118

THE INTERACTION OF PHOSPHORYL- AND THIOPHOSPHORYL SULFENAMIDES WITH
ISOCYANATES AND ISOTHIOCYANATES

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 47, No 10, Oct 77 pp 2176-
2178 manuscript received 13 Feb 76

KHASKIN, B. A., TORGASHEVA, N. A. and MEL'NIKOV, N. N., All-Union Scientific
Research Institute for Chemical Plant Protection Substances

[Abstract] The reaction of phosphoryl- and thiophosphoryl sulfenamides with isocyanates and isothiocyanates leads to the formation of phosphoryl- and thiophosphoryl sulfeneurea. The reaction occurs easily with arylisocyanates at room temperature in organic solvents in a few minutes. The interaction of alkylisocyanates with unsubstituted phosphoryl and thiophosphoryl sulfenamides, as well as N-monosubstituted phosphoryl- and thiophosphoryl sulfenamides with arylisocyanates occurs under more severe conditions, i.e. heating to 80-100 C for 2-3 hours. The new compounds are colorless crystals, easily crystallized from organic solvents. A table of chemical compositions is presented. Table 1, References 2: Russian.

USSR

UDC 541.12.038.2

INFLUENCE OF THE STRUCTURE OF PHOSPHORYL-CONTAINING COMPOUNDS ON THEIR
ASSOCIATION WITH THE CATIONS OF LITHIUM AND POTASSIUM

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 47, No 10, Oct 77 pp 2172-
2175 manuscript received 9 Feb 76

OSIPENKO, N. G., PETROV, E. S., PANNEVA, Yu. I., TSVETKOV, Ye. N., and
SHATENSHTAYN, A. I., L. Ya. Karpov Institute of Physical Chemistry

[Abstract] The influence of the structure of phosphoryl-containing compounds on their solvating capacity for alkali metal cations was studied by the indicator method in solutions of ter-butylates in 1,2-dimethoxyethane (DME) and in ter-butyl alcohol in earlier works. This work studies the influence of the addition of phosphoryl-containing substances on the electrical conductivity of solutions of salts of 2,4-dinitrophenol in tetrahydrofuran by the method of Gilkerson, which provides a clearer picture of the relative solvating capacity of the compound studied. It was found that their association with the cations of lithium and potassium is facilitated by the high nucleophilicity of the phosphoryl group, by decreasing the degree of its steric shielding by substituents with the phosphorus atom and by the presence in the substituents of cation coordination centers. The capability of phosphoryl-containing compounds for association with

cations of lithium 2,4-dinitrophenolate depends on the nucleophilic nature of the phosphoryl group to a greater extent than the solvation effect with lithium ter-butylate. Figures 2, References 6: 4 Russian, 2 Western.

USSR

UDC 665.7.038.5.002.2:665.765

SYNTHESIS OF THE ETHYL ESTERS OF O,O-DIALKYL- AND O,O-DI(ALKYLPHENYL)-DITHIOPHOSPHORYLACETIC ACID AND THEIR EVALUATION AS ASHLESS ADDITIVES TO LUBRICANTS

Moscow NEFTEPERERABOTKA I NEFTEKHIMIYA in Russian No 9, 1977 pp 20-21
manuscript received 2 Nov 76

BELOV, P. S., ZASKAL'KO, P. P., PARFENOVA, V. A., KUZNETSOVA, N. M.,
LESNINOVA, V. A. and LEZHNEVA, I. M.

[Abstract] The title esters were synthesized by condensation of respective potassium dialkyl- and di(alkylphenyl)-dithiophosphates with ethyl ester of monochloroacetic acid. The products are transparent light yellowish liquids soluble in mineral oils. Studies of thermal oxidation stability of the oil MT-16 with these additives showed that the resistance to oxidation improved with increased number of carbon atoms in the alcohol portion of these esters. Best results were obtained with esters containing 12-16 carbon atoms in the alcohol moiety. Figure 1, References 3: 1 Russian, 2 Western.

USSR

UDC 542.91:547.1'118:547.94:547.831.3

SYNTHESIS OF CERTAIN O,O-DIALKYLTHIOPHOSPHATES CONTAINING ANABASINE AND DECAHYDROQUINOLIN GROUPS

Moscow IZVESTIYA AKADEMII NAUK SSSR--SERIYA KHIMICHESKAYA in Russian No 12,
Dec 77 pp 2806-2808, manuscript received 13 Apr 77

DALIMOV, D. N., ABDUBAKHABOV, A. A., ASLANOV, Kh. A., SADYKOV, A. S. and
GODOVIKOV, N. N., Institute of Hetero-Organic Compounds, Academy of
Sciences, USSR, Moscow; Department of Bio-organic Chemistry, Academy of
Sciences, Uzbek, SSR, Tashkent

[Abstract] A number of N-[β -(dialcoxyphosphinyl)mercaptoethyl]anabasines and their iodomethylates (I) were synthesized, as well as a number of N-[β -(dialcoxyphosphinyl)mercaptoethyl]decahydroquinolins and their iodomethylates (II). Compounds (I) and (II) were produced by interacting

potassium 0,0-dialkylthiophosphates with N- β -chloroethylanabasine and N- β -chloroethyldecahydroquinolin in absolute ethanol. Table 1, References 3: Russian.

USSR

UDC 541.121

COMPLEX FORMATION OF NITRIC ACID WITH OXIDES OF PHOSPHINES, ARSINES AND AMINES

Moscow ZHURNAL NEORGANICHESKOY KHIMII in Russian Vol 23, No 1 Jan 78, pp 113-120, manuscript received 27 May 76

ROZEN, A. M., NIKOLOTOVA, Z. I., KARTASHEVA, N. A. and KASUMOVA, L. A.

[Abstract] A study was made of the attachment of the first molecule of nitric acid to the organic oxides Ph_3PO , R_3PO , Ph_3AsO , Ph_2RAsO , PhR_2AsO , R_3AsO , and R_3NO . Upon transition to arsine oxides, in addition to the formation of the hydrogen bond with the acid, a new mechanism of complex formation develops - transfer of a portion; it was shown that as the basicity of the oxides increases, the significance of this mechanism also increases. Similar to amine salts, the complexes $[\text{R}_3\text{XOH}...\text{NO}_3]$ are polymerized; the monomer extraction constants and polymerization constants were estimated. It was found that the nitric acid extraction isotherms for the oxides in the interval of acidity of 0.5-11 mol are practically identical. The only difference is in the attachment of the first acid molecule. Figures 4, Tables 4, References 7: 4 Russian, 3 Western.

USSR

UDC 547.468.547.562

SYNTHESIS OF VARIOUS ESTERS OF PHOSPHONIC AND AMIDOPHOSPHORIC ACIDS WITH OXYBENZOIC ACIDS

Tashkent UZVEKSKIY KHIMICHESKIY ZHURNAL in Russian No 6, 1977 pp 66-69, manuscript received 29 Sep 76

VAKHIDOVA, V. V., MAKHAMATKHANOV, M. M., BAKHTIYAROVA, F. A., YULDASHEVA, Kh. E., MAKSUDOV, N. Kh. and AKBAROV, A., Tashkent Institute of Irrigation Engineers and Mechanization of Agriculture

[Abstract] The literature does not contain data on phosphorus-containing

derivatives of salicylic acids and their pesticide activity. The authors synthesized amides of salicylphosphorous acid and some esters of salicylic acid and o-methylcarboxyphenol with alkyl(aryl)phosphonic acids. A general method of production of di-(o-methylcarboxyphenyl)phosphonates is described. A table of physical and chemical constants of the phosphorus-containing esters of o-methylcarboxyphenols is presented. Pesticide properties are not discussed. Tables 2, References 5: 4 Russian, 1 Western.

USSR

UDC 547.26'118.07

N-(PHOSPHONYLACYL) INDOLES

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian No 11, 1977 p 2638, manuscript received 28 Dec 76

RAZUMOV, A. I., GUREVICH, P. A., KUDRYAVTSEV, B. V. and BAYGIL'DINA, S. Yu., Kazan Institute of Chemical Technology imeni S. M. Kirov; Institute of Organic and Physical Chemistry imeni A. Ye. Arbuzov; Kazan Affiliate, Academy of Sciences, USSR

[Abstract] Continuing their work on the synthesis of phosphorylated indoles, the authors studied the interaction of N-chloroacetylindole with esters of P^{III} acids by heating of the compounds at 130-140° C in a current of dry carbon dioxide for 5-6 hours. The reaction products have a phosphonate structure. They can also be produced by a Michaelis-Becker reaction, heating equimolar quantities of N-chloroacetylindole with the sodium salt of dialkylphosphorus acid in benzene. References 3: 2 Russian, 1 Western.

USSR

UDC 547.241.088.8

REDUCTION OF PHENYLTHIOPHOSPHORYLDICHLORIDE WITH ORGANIC COMPOUNDS OF LITHIUM

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian No 11, 1977 p 2637, manuscript received 23 Nov 76

SUKHORUKOVA, N. A. and TIMOKHIN, B. V., Irkutsk State University; Institute of Petro- and Coal-Chemical Synthesis, Irkutsk State University

[Abstract] The authors discovered that when ethyllithium acts on phenylthiophosphoryldichloride with heating for 2 hours, phenyldiethyl-

phosphine is formed as the main reaction product. Phenyllithium reacts with phenylthiophosphoryldichloride to form triphenylphosphine sulfide (yield 60%). Thin-layer chromatography indicates that triphenylphosphine is also present in the reaction mixture. References 4: Russian.

USSR

UDC 547.241

SYNTHESIS OF 1,3-DI(OXOALKOXYPHOSPHA)CYCLOALKANES

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian No 11, 1977 pp 2636-2637, manuscript received 16 Nov 76

NOVIKOVA, Z. S., PRISHCHENKO, A. A. and LUTSENKO, I. F., Moscow State University

[Abstract] In studying the properties of tetraalkyl esters of methylenediphosphonous acid, the authors found the Arbuzov rearrangement of the esters with α, ω -dihalide alkanes leads to the formation of previously unknown organophosphorus compounds - 1,3-di(oxoalkoxyphospha)cycloalkanes with high yield in dilute solutions of inert organic solvents. Reference 1: Russian.

USSR

UDC 547.245.63.07

1-ADAMANTYLALKYL(ARYL)PHENOXY-SILANES

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian No 11, 1977 p 2633, manuscript received 10 Nov 76

NO, B. I., USHCENKO, V. P., NIKOLENKO, V. S. and NOVIKOV, S. S., Volgograd Polytechnical Institute

[Abstract] The reaction of adamantylhalidesilanes with phenol produces 1-adamantylalkyl(aryl)phenoxy-silanes. The reaction is conducted in an absolute diethyl ether, benzene, toluene at their boiling points, and also by fusion of the initial compounds with continuous agitation of the reaction mixture. The 1-adamantylalkyl(aryl)phenoxy-silanes produced are white crystalline substances which do not hydrolyze in air, soluble in ether, aromatic hydrocarbons and dioxane.

USSR

UDC 547.548+546.183

THE MECHANISM OF THE REACTION OF TRIETHYLPHOSPHITE WITH PICRYLCHLORIDE

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian No 11, 1977 pp 2632-2633,
manuscript received 3 Jan 77

GOLOLOBOV, Yu. G., ONYS'KO, P. P. and PROKOPENKO, V. P., Institute of
Organic Chemistry, Academy of Sciences, Ukrainian SSR

[Abstract] The authors established that triethylphosphite reacts with picryl chloride by initial attack at the chlorine atom to form an intermediate ionic pair which, in benzene, breaks down in the Arbuzov reaction to phosphonate and ethyl chloride, in methanol - to trinitrobenzene, trimethylphosphite, dimethylphosphite, ethanol, methylchloride and dimethyl ether. In a mixture of benzene and methanol, the products of both reactions are formed. References 2: Western.

USSR

UDC 547.245

SOME REGULARITIES OF THE REACTION OF HYDROSILYLATION UNDER THE INFLUENCE OF PLATINUM (0) TETRAKIS-TRIPHENYLPHOSPHINE

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian No 11, 1977 pp 2625-2626,
manuscript received 22 Jan 77

REYKHSFEL'D. V. O., KHVATOMVA, T. P. and ASTRAKHANOV, M. I., Leningrad
Institute of Technology imeni Lensovet

[Abstract] Studies of the mechanism of the reaction of hydrosilylation in the presence of phosphine complexes of platinum and nickel have assumed that the first event in the process is reducing attachment of silicon hydride, reducing the complex-forming metal to the null valent state. To test this assumption, the authors studied the kinetics of attachment of silicon hydrides to arylalkenes in the presence of platinum tetrakis-triphenylphosphine at 15° with an excess of solvent. They found that the reaction of hydrosilylation generally follows the same rules as in the case of olefin platinum complexes. Treatment of the initial complex with silicon hydride results in disappearance of the induction period of the reaction; treatment with styrene is not effective in this way. The main difference between the reaction with Pt (PPh₃)₄ and the reaction with olefin complexes with Pt(II) is the rapid drop in the reaction rate after about 40% conversion. The valent state of the platinum in the initial complex is not significant for catalysis of the reaction of hydrosilylation; the coordination of the silane at the platinum atom is the determining factor. References 6: Western.

USSR

UDC 547.77+661.718.1

SYNTHESIS OF PHOSPHORYLATED 1,3,4-OXADIAZOLES

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian No 11, 1977 pp 2623 manuscript received 10 Jan 77

SHISHKIN, V. Ye., ZOTOV, Yu. L. and NO, B. I., Volgograd Polytechnical Institute

[Abstract] Interaction of dialkylphosphonyliminocarboxylic acid ester hydrochlorides with acylhydrazine at a molar ratio of 1:1 in boiling dioxane leads to the formation of 5-alkyl(aryl)-2-dialkoxyalkyl phosphonyl-1,3,4-oxadiazoles. Reference 1: Russian.

USSR

UDC 547.241

THE REACTIONS OF FULL PHOSPHITES WITH 1-NITRO-3,3,3-TRICHLOROPROPENE

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian No 11, 1977 pp 2622-2623, manuscript received 24 Jan 77

BORISOVA, Ye. A., GAREYEV, R. D. and SHERMERGORN, I. M., Kazan State Veterinary Institute

[Abstract] Unsaturated organophosphorus compounds can be produced by reacting tricoordinated phosphorus atom acid esters with nitroolefins; the authors suggested a plan of intermediate realization of the corresponding bipolar ion, subsequent stabilization of which is possible by proton shift of the hydrogen atom at the α carbon atom. This proton shift is confirmed in this article by studying the reaction of trimethylphosphite with 1-nitro-3,3,3-trichloropropene, forming the dimethyl ester of α -nitromethyl- β , β -dichlorovinylphosphonic acid. References 4: 3 Russian, 1 Western.

USSR

UDC 547.341

THE REACTION OF TRIS(4-DIMETHYLAMINOPHENYL)PHOSPHINE AND ITS OXIDES WITH DIAZO COMPOUNDS

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian No 11, 1977 pp 2621-2622, manuscript received 4 Feb 77

KORMACHEV, V. V., CHALYKH, S. N., CHALYKH, E. A. and KUKHTIN, V. A., Chuvash State University

[Abstract] During a study of the possibility of using easily available tris(4-dimethylaminophenyl)phosphine and its oxide as azo components in the synthesis of dyes, the authors discovered for the first time the reaction of electrophilic substitution with extraction of a phosphorus-containing fragment. 4'-dimethylamino-2-chloro-4-nitroazobenzene is synthesized and its physical properties noted. Preliminary experiments indicate that the dimethylaminophenyl derivatives of phosphorus have a general property of reacting with electrophilic reagents to form products of the extraction of a phosphoryl group. Reference 1: Russian.

USSR

UDC 547.26'118

FORMATION OF TETRAALKYLETHYLENEDIPHOSPHINE DIOXIDES UPON INTERACTION OF POTASSIUM DIALKYLPHOSPHINITES WITH ALKYL-2-CHLOROETHYL ETHERS

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian No 11, 1977 pp 2620-2621, manuscript received 30 May 77

OSIPENKO, N. G. and TSVETKOV, Ye. N.

[Abstract] The interaction of potassium dibutylphosphinite with methyl-2-chloroethyl ether produces tetrabutylethylenediphosphine dioxide. This dioxide is formed with good yield with a ratio of the initial reagents of 2:1. Tetraamylethylenediphosphine dioxide is synthesized similarly. A few reactions of the products are noted. References 3: 2 Russian, 1 Western.

PETROV, K. A., CHAUZOV, V. A. and MAL'KEVICH, N. Yu.

[Abstract] It was found that 5,10-dihydro-5-methyl(phenyl)dibenzo[b,e]phosphorine-10-ones can be easily produced by 4-state synthesis from phenylphosphine acid anhydrides by the action of o-tolymagnesium bromide, subsequent oxidation of the phosphine oxides with potassium permanganate in aqueous pyridine, cyclization upon heating of the acid produced in polyphosphoric acid and reduction of the ketophosphine oxides thus produced with trichlorosilane. Some reactions of the products occurring at the phosphorus atom and carbonyl group are studied. Table 1, References 6: 1 Russian, 5 Western.

USSR

UDC 547.558.1

REACTION OF FLUORENYLIDENE TRIPHENYLPHOSPHORILIDE WITH DIPHENYLKETONE AND DIPHENYLACETIC ALDEHYDE

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian No 11, 1977 pp 2513-2516, manuscript received 11 Mar 76

SHEVCHUK, M. I., KUSHNIR, V. N. and DOMBROVSKIY, A. V., Chernovitsa State University

[Abstract] It was demonstrated that carbonyl-containing systems with activated carbonyl group react readily with fluorenylidene triphenylphosphorilide, yielding unsaturated compounds. The Wittig reaction with diphenylketene yields fluorenylidene diphenylethylene, which dimerizes upon heating. The Wittig reaction with diphenylacetic aldehyde occurs similarly. When fluorenylidene triphenylphosphorilide interacts with bromodiphenylacetic aldehyde, phosphonium salt is formed - fluorene-9-diphenylethenoxy-9-triphenylphosphonium bromide. Figure 1, References 5: 1 Russian, 4 Western.

USSR

UDC 547'546.18'17'13

STRUCTURE AND DONOR ACTIVITY OF (TETRAFLUOROPROPOXY)CHLOROCYCLOTRIPHOSPHAZENES

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian No 11, 1977 pp 2502-2507, manuscript received 9 April 76

DERENDYAEVA, V. G., KOLODYAZHNYI, Yu. V., FEDOROV, S. G., ALIYEVA, S. K., ZAPUSKALOVA, S. F., GOL'DIN, G. S. and OSIPOV, O. A., Rostov-on-Don State University

[Abstract] Results are presented of a study of the structure and donor activity of (tetrafluoropropoxy)chlorocyclotriposphazenes of the general formula $N_3P_3Cl_{6-n}(OX)_n$, where $X = CH_2(CF_2)_2H$, $n = 0-6$. A tendency was established toward nongeminal substitution of tetrafluoropropoxy groups for chlorine atoms in the trans position relative to the cyclo-triphosphazene ring. Equilibrium of several conformers was demonstrated for derivatives with $n = 2-6$. The electron influence of the tetrafluoropropoxy group confirms the "island model" of the cyclo-triphosphazene ring. Figure 1, Tables 4, References 16: 9 Russian, 7 Western.

USSR

UDC 547.241+547.422+547.431

REACTIONS OF 1,5-DIKETONES. XXV. REACTION OF BENZALDIACETOPHENONE, 2-PHENACYLOBENZYL CYCLOHEXANONE AND 2,2'-METHYLBISCYCLOHEXANONE WITH DIALKYLPHOSPHITES

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian No 11, 19-7 pp 2496-2502, manuscript received 13 Mar 76

BYSOTSKIY, V. I., CHUPRAKOVA, K. G. and TILICHENKO, M. N., Far Eastern State University, Vladivostok

[Abstract] The authors reacted 1,5-diketones with dimethylphosphite and diisopropylphosphite. The product of the reaction of benzalldiacetophenone with dimethylphosphite is an acid methyl ester of 1-oxy-1,3,5-triphenylpentane-5-one-1-yl-phosphonic acid, which is easily dehydrated to an acid methyl ester of 2,4,6-triphenyl-2,2,3-dihydropyran-2-yl-phosphonic acid. When diisopropylphosphite acts on 1,5-diketones in the presence of sodium methylate, a process of re-esterification occurs, producing the same products as with dimethylphosphite. Table 1, References 7: 5 Russian, 2 Western.

USSR

UDC 547.569-547.436

SYNTHESIS AND REACTIONS OF 2-CHLORO-5-TERT-ALKYLBENZO-1-OXY-3-THIO-2-PHOSPHOLANES

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian No 11, 1977 pp 2492-2496, manuscript received 26 Feb 76

KULIYEV, A. M., ALIYEV, Sh. R., MAMEDOV, F. N., MOVSUT-ZADE, MIRZA and SHIKHIYEVA, M. I., Institute of the Chemistry of Additives, Academy of Sciences, Azerbaijan SSR

[Abstract] A report is presented on the production of 2-chloro-5-terbutyl- (I) and 2-chloro-5-(1,1,3,3,-tetramethylbutyl)benzo-1-1-oxy-3-thio-2-2-phospholane (II) and their ethers. The products are the result of the reaction of o-oxyalkylthiophenols with phosphorus trichloride. Interaction of the products with aliphatic alcohols and mercaptans synthesizes 2-alkoxy- and 2-alkylthio-5-tert-alkylbenzo-1-oxy-3-thio-2-phospholanes. Figures 3, References 5: 3 Russian, 2 Western.

USSR

UDC 547.241

STUDIES OF THE DERIVATIVES OF PHOSPHONOUS AND PHOSPHONIC ACIDS. XCV. THE REACTION OF ESTERS OF ALKYLDITHIOPHOSPHONOUS ACIDS WITH ALKYL HALIDES

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian No 11, 1977 pp 2489-2492, manuscript received 24 May 76

KRASIL'NIKOVA, Ye. A., RAZUMOV, A. I., STARSHOV, I. M., ORLOVA, G. V., STARSHOV, N. I. and SULEYMANOV, F. Z., Kazan Institute of Chemical Technology imeni S. M. Kirov

[Abstract] A method of quantitative analysis of a mixture of dialkyl sulfides and alkyl bromides by gas-liquid chromatography was developed and the retention times and relative sensitivities were found for a number of alkyl bromides RBr (where R is ethyl, propyl, isopropyl, butyl, isobutyl, sec-butyl) and dialkyl sulfides R-S-R' (diethyl-, ethylpropyl-, ethylisopropyl-, dipropyl-, propylisopropyl-, ethylbutyl-, propylisobutyl-, propylbutyl-, dibutyl sulfides). The content of dialkyl sulfide and alkyl bromides was determined in a mixture formed upon interaction of esters of ethyl (or phenyl) dithiophosphonous acid with alkyl bromides. The study expands the understanding of secondary processes accompanying the interaction of alkyl(aryl) dithiophosphonous acid esters with alkyl halides and refines the reaction plan suggested earlier by one of the authors. Figure 1, Tables 2, References 16: 14 Russian, 2 Western.

USSR

UDC 547.341

PHOSPHORUS-CONTAINING HETEROCYCLES. CONDENSATION OF PYROCATECHIN ESTERS OF ARYLPHOSPHONOUS ACIDS WITH CROTONIC ALDEHYDE

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian No 11, 1977 pp 2485-2489
manuscript received 25 Apr 76

VASIL'YEV, V. V., RAZUMOVA, N. A., ZAKHAROV, V. I. and GRUK, M. P.,
Leningrad Institute of Technology imeni Lensovet; All-Union Scientific
Research Institute for Paper

[Abstract] A study was made of the condensation of a series of pyrocatechin esters of arylphosphonous acids with crotonic aldehyde to determine the factors influencing the ratio of isomers produced as a result of condensation. The pyrocatechin esters of arylphosphonous acids condense with crotonic aldehyde to form stable syn- and anti-stereoisomers, the anti-isomer being produced more in the condensation products at the pyrocatechin derivatives than is the case with ethylene glycol analogues. The content of syn- and anti-stereoisomers in the condensation products is independent of the substituent in the phenol ring of the phosphorus component within the limits of accuracy of the experiment ($\pm 11\%$), but is determined by the temperature of the reaction. Figures 2, Tables 2, References 3: Russian.

USSR

UDC 547.546+547.241+538.18

ANIONIC σ COMPLEXES IN THE REACTIONS OF COMPOUNDS OF PHOSPHORUS WITH TRINITROBENZENE. II.

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian No 11, 1977 pp 2480-2484
manuscript received 25 Feb 76

ONYS'KO, P. P. and GOLOLOBOV, Yu. G., Institute of Organic Chemistry,
Academy of Sciences, Ukrainian SSR

[Abstract] A study was made of the interaction of trialkylphosphites, triamidophosphites and trialkylphosphines with 1,3,5-trinitrobenzene. Nucleophilic attack of the phosphorus on the unsubstituted carbon of the trinitrobenzene occurs with intermediate formation of anionic σ complexes. It is shown for trialkylphosphites that the σ complexes are converted to the corresponding trinitrophenylphosphonates as hypothesized. Figures 2, Tables 2, References 11: 4 Russian, 7 Western.

USSR

UDC 547.26'118

STUDY OF THE STEREOCHEMISTRY OF 2-R-3-ISOPROPYL-1,3,2-OXAAZAPHOSPHORINANES
BY THE NMR METHOD

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian No 11, 1977 pp 2474-2480
manuscript received Apr 76

NIFANT'YEV, E. Ye., BORISENKO, A. B., SOROKINA, S. F., GRACHEV, M. K. and
ZAVALISHINA, A. I., Moscow Pedagogic Institute imeni V. I. Lenin

[Abstract] This work is the first structural study in the area of 1,3,2-oxaazaphosphorinanes which contain a trivalent phosphorus atom. It supplements data on the stereochemistry of phosphorinanes, studied previously using cyclosymmetrical systems as an example. The stereochemical study of a number of 2-R-3-isopropyl-1,3,2-oxaazaphosphorinanes by the NMR method shows that they are in one conformation with primarily axial orientation of these substituents at the phosphorus atom. Oxaazaphosphorinanes were synthesized which are derivatives of hypophosphorous and phosphonous acids. Tables 4, References 12: 6 Russian, 6 Western.

USSR

UDC 547.558.1:541.141.1

PHENOPHOSPHAZINES. I. PHOTOIONIZATION MASS SPECTRA OF 5-METHYL-5,10-DIHYDROPHENOPHOSPHAZINES

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian No 11, 1977 pp 2468-2474
manuscript received 28 May 76

SMIRNOV, A. N., YAGODINA, L. A., ORLOV, V. M., PISKUNOVA, O. G., BOKANOV, A. I. and STEPANOV, B. I., Moscow Institute of Chemical Technology imeni D. I. Mendeleev; Institute of Molecular Biology, Academy of Sciences,
USSR

[Abstract] In order to evaluate the possibility of using dihydrophenophosphazines as antioxidants, organic semiconductors and in pharmaceuticals, the authors used the method photoionization to determine the first adiabatic ionization potentials of derivatives of 5-methyl-5,10-dihydrophenophosphazine. The photoionization of 5-methyl-5,10-dihydrophenophosphazines results from removal of an electron from the molecular π orbital. The ionization potentials of dihydrophenophosphazines, derivatives of trivalent phosphorus, are similar to the ionization potentials of phenothiazines. Figures 1, Tables 2, References 18: 11 Russian, 7 Western.

USSR

UDC 547.26'118

THE REACTION OF TRIETHYLPHOSPHITE WITH CARBONYL-CONTAINING COMPOUNDS IN THE PRESENCE OF HYDROGEN CHLORIDE

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian No 11, 1977 pp 2465-2468
manuscript received 14 May 76

GAZIZOV, T. Kh., KIBARDIN, A. M., KHARLAMOV, V. A., KARELOV, A. A. and PUDOVNIK, A. N., Institute of Organic and Physical Chemistry imeni A. Ye. Arbuzov; Kazan Affiliate, Academy of Sciences, USSR

[Abstract] It was demonstrated that triethylphosphite and carbonyl-containing compounds with an electro-acceptor substituent interact in the presence of dry hydrogen chloride to form only the corresponding α -oxyphosphonates. The reaction is conducted at low temperatures (-70°C) with a mixture of triethylphosphite with hydrogen chloride (ratio 1:1). In these reactions, the electrophilic site of the carbonyl-containing compounds is the carbon atom of the carbonyl group. Table 1, References 13: 8 Russian, 5 Western.

USSR

UDC 547.26.118

KINETICS AND MECHANISM OF THE REACTION OF ATTACHMENT OF DITHIO ACIDS OF PHOSPHORUS TO β -ALKOXYVINYLPHOSPHONATES

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian No 11, 1977 pp 2460-2465
manuscript received 27 Feb 76

KUTYREV, G. A., KASHINA, N. V., ISHMAYEVA, E. A., CHERKASOV, R. A. and GUDOVNIK, A. N., Kazan State University

[Abstract] A study of the kinetics of the reactions of attachment of diethyldithiophosphoric acid to various β -alkoxyvinylphosphonates and their thioanalogues shows that the reaction rate constants determined in p-xylene at 37°C follow a second order equation - first order for each of the reagents. Replacement of the phenyl groups at the phosphorus atom of an unsaturated compound by a more strongly electron accepting alkoxyl, phenoxyl or dioxyalkyl group reduces the reaction rate. Replacement of the phosphoryl group with a thiophosphoryl group has the same effect. The electrophilic mechanism of the reaction of attachment of phosphorus dithio acids to β -alkoxyvinylphosphonates was established. The influence of solvents was studied and the polar nature of the transient state of the reaction demonstrated. Tables 4, References 17: 14 Russian, 3 Western.

USSR

UDC 547.558.1

THE QUESTION OF DIADE PHOSPHORUS-CARBON TAUTOMERISM

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian No 11, 1977, pp 2454-2460
manuscript received 31 May 76

MASTRYUKOVA, T. A., ALADZHEVA, I. M., LEONT'YEVA, I. V., SVOREN', V.A.,
PETROVSKIY, P. V. and KABACHNIK, M. I., Institute of Hetero-Organic
Compounds, Academy of Sciences, USSR

[Abstract] Phosphine-substituted salts were synthesized from hexaphenyl-carbodiphosphorane and the corresponding dialkylchlorophosphines with a yield of 70-90%. The salts produced are white crystalline substances which oxidize rather easily, particularly in solution. The method of NMR spectroscopy was used to show that the phosphine-substituted phosphorane-phosphonium salts protonize in solution to form mesomer phosphorane-diphosphonium salts with a P-H bond. Figures 2, Tables 2, References 15: 4 Russian, 11 Western.

USSR

UDC 547.538.1

SOME REATIONS OF DIAKYLPHOSPHINO SUBSTITUTED PHOSPHORANE-PHOSPHONIUM SALTS

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian No 11, 1977, pp 2449-2454
manuscript received 31 May 76

MASTRYUKOVA, T. A., ALADZHEVA, I. M., LEONT'YEVA, I. V., SVOREN', V. A.,
PETROVSKIY, P. V. and KABACHNIK, M. I., Institute of Hetero-Organic Com-
pounds, Academy of Sciences, USSR

[Abstract] A study was made of the reactivity of salts of dialkylphosphino substituted phosphorane-phosphonium salts (I) in relationship to certain other electrophilic reagents. The reactions studied include alkylation, oxidation, attachment of sulphur and phenylazide. IR and NMR spectra show that all of the reactions studied occur through the trivalent phosphorus atom. Protonation of dialkylphosphinyl-, -thiophosphinyl-and-N-iminophosphinyl substituted phosphorane-phosphonium salts occurs at the oxygen, sulphur and nitrogen, respectively. Tables 2, References 9: 3 Russian, 6 Western.

REACTION OF CYCLIC PHOSPHITES WITH CHLORO-, DICHLORO- AND TRICHLORO-METHYLISOCYANATES

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian No 12, 1977, pp 2766-2769
manuscript received 19 May 76

KOZHUSHKOV, B. N., GUMENYUK, A. V. and SHOKOL, V. A., Institute of Organic Chemistry, Academy of Sciences, Ukrainian SSR

[Abstract] A study was made of the interaction of cyclic halogen phosphites with chloro-, dichloro- and trichloromethylisocyanates. These compounds interact with 2-chloro- and 2-fluorophospholanes in Arbuzov re-grouping with opening of the ring and formation of (β -chloroethoxychlorophosphonyl)- and (β -chloroethoxyfluorophosphonyl)methyl-, chloromethyl- and -dichloromethylisocyanates. When trichloromethylisocyanates react with two moles of 2-chlorophospholane, bis (β -chloroethoxychlorophosphonyl)chloromethylisocyanate is formed. Fluorination of (β -chloroethoxychlorophosphonyl)methyl-, -chloromethyl- and dichloromethylisocyanates with arsenous trifluoride produces (β -chloroethoxyfluorophosphonyl)methyl-, -chloromethyl- and -dichloromethylisocyanates. Table 1, References 4: Russian.

 β -PHOSPHORYLATED ETHYLISOCYANATES

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian No 12, 1977, pp 2759-2765
manuscript received 19 Apr 76

GAMALEYA, V. F. and SHOKOL, V. A.

[Abstract] A study was made of the reaction of β -(diethoxyphosphonyl)- and β -(dipropoxyphosphonyl) ethylisocyanates with phosphorus pentachloride, in order to synthesize new types of phosphorylated alkylisocyanates - β -(alkoxychlorophosphonyl)- and β -(dichlorophosphonyl)ethylisocyanates. The reaction of β -(dichlorophosphonyl)promionic acid chloride with trimethylsilylazide forms β -(dichlorophosphonyl)- or β -(chloroazidophosphonyl) propionic acid azides, which, when heated, are transformed to the corresponding ethylisocyanates. Heating of β -(dichlorophosphonyl)ethylisocyanate with arsenous trifluoride produces β -(difluorophosphonyl)ethylisocyanate. β -phosphorylated ethylisocyanates react with alcohols and amines to form phosphorylated urethanes and urea. Table 1, References 7: Russian.

USSR

UDC 538.19.08+541.57

ULTRAVIOLET ABSORPTION SPECTRA OF PHOSPHORUS PENTACHLORIDE IN VARIOUS SOLVENTS

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian No 12, 1977, pp 2753-2759
manuscript received 8 Jun 76

RATOVSKIY, G. V., SERGIENKO, L. M., ROZINOV, V. G. and KAZACHENKO, N. A.,
Irkutsk State University; Institute of Petroleum and Coal-Chemical Syn-
thesis, Irkutsk State University

[Abstract] A study was made of the electron spectra of phosphorus pentachloride in various solvents (cyclohexane, dichloroethane, phosphorus oxychloride, benzene, toluene and anisol); the variation in spectral characteristics with PCl_5 concentration in the solvent was also studied. A UV absorption band in the 240 nm area is characteristic for the monomer molecular form of phosphorus pentachloride. Study of the characteristics of the UV absorption spectra shows that phosphorus pentachloride cyclohexane, dichloroethane and phosphorylchloride is present in the monomer molecular form over a broad range of concentrations. Slight ionization and dissociation of PCl_5 into ions is possible in phosphorus fluoroxide. Benzene and toluene form weak donor-acceptor complexes with phosphorus pentachloride, with slight charge transfer. Figures 3, Tables 3, References 16: 6 Russian, 10 Western.

USSR

UDC 547. 241

REGROUPING OF N,N-DIETHYL-N'-PHENYLDIAMIDE OF CHLOROMETHYLPHOSPHONIC ACID UNDER THE INFLUENCE OF NUCLEOPHILIC AGENTS

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian No 12, 1977, pp 2749-2753
manuscript received 19 Apr 76

PETROV, K. A., CHAUZOV, V. A., YEROKHINA, T. S. and PASTUKHOVA, I. V.

[Abstract] A study was made of the possibility of migration of an amino group, i.e., of intramolecular amination, of chloromethyl organophosphorus compounds. The initial compound used in the reaction is N,N-diethyl-N'-phenyldiamide of chloromethylphosphonic acid. It is shown that the initial reagent is converted under the influence of sodium alcoholates and phenolate to amidoesters of N-phenylaminomethylphosphonic acid. References 2: Russian.

USSR

UDC 547.242

SYNTHESIS AND PROPERTIES OF α -SUBSTITUTED METHYLPHOSPHONATES

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian No 12, 1977, pp 2741-2749
manuscript received 19 Apr 76

PETROV, K. A., TRESHCHALINA, L. V. and CHIZHOV, V. M.

[Abstract] A study was made of the reaction of dialkylphosphonomethylarene (alkane) sulphonates with alcohols, glycols and amines, in order to develop a method of synthesis of α -substituted methylphosphonates. The properties of some of the compounds produced were studied. Phosphonomethylarene- and alkanesulphonates react with glycolates in the presence of glycols and with amines to form α -, β - and γ -oxyalkoxy- and α -amino-methyl-phosphates, respectively. Phosphonomethylation of alcohols is complicated by processes of dealkylation and re-esterification. α -aryl-aminomethylphosphonates are hydrolyzed in acids to the co-responding phosphonic acids. Phenylaminomethylphosphonic and α -phenylaminobenxylphosphonous acid combine with aromatic aldehydes to form phosphorus-containing benzhydrols. Tables 2, References 6: 5 Russian, 1 Western.

USSR

UDC 543.253:547.546.547.558.1

PHENOPHOSPHAZINES. II. POLAROGRAPHIC REDUCTION OF NITRO COMPOUNDS BY 5,10-DITHYDROPHENOPHOSPHAZINE

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian No 12, 1977, pp 2730-2734
manuscript received 16 Jul 76

POLIYEVKTOV, M. K., BOKANOV, A. I., PISKUNOVA, O. G. and STEPANOV, B. I.,
Moscow Institute of Chemical Technology imeni D. I. Mendeleev

[Abstract] The method of polarography was used to study the dinitro compounds of 5,10-dihydrophenophosphazines in dimethylformamide. The polarograms of 2,8-dinitro-5-methyl-5,10-dihydrophenophosphazines contain 4 waves: the first and second correspond to reversible single-electron transfer, the third to the reduction of nitro groups to hydroxylamino groups; at the potential of the fourth polarographic wave, the hydroxylamino groups and the heterocycle are reduced. Figures 3, Tables 2, References 7: 5 Russian, 2 Western.

USSR

UDC 547.26'118

ALKYLATION OF PHOSPHORUS MONOTHIOACIDS BY ALIPHATIC DIAZO COMPOUNDS.
VI. REACTION WITH DIAZOPROPANE AND SOME HIGHER HOMOLOGS

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian No 12, 1977, pp 2723-2730
manuscript received 1 Mar 76

MASTRYUKOVA, T. A., KALYANOVA, R. M., GENKINA, G. K., SHCHERBINA, T. M.,
SVOREN', V. A. and KABACHNIK, M. I., Institute of Hetero-Organic Com-
pounds, Academy of Sciences, USSR

[Abstract] A study is made of the reaction of diazopropane with a number of phosphorus monothioacids. S- and O-propyl esters are formed; the ratio of their yields (Q_S/Q_S) depends on the substituent at the phosphorus atom. A linear dependence of the logarithm of the yield ratio on the sum of polar constants of substituents at the phosphorus atom is established. An explanation is presented for the fact that upon transition from diazomethane to its homologs, the Q_S/Q_S ratio first sharply decreases, then remains practically constant, based on the idea that the ratio is determined by the relationship of rate constants of transformation of an ion pair consisting of the alkyl diazonium cation and the thiophosphorus anion: upon transition from diazomethane to its homolog, the first reaction is retarded, the second accelerated. Figure 1, Tables 4, References 18: 13 Russian, 5 Western.

USSR

UDC 547.341

DERIVATIVES OF β -DIALKYLAMINO- β -METHYL VINYLPHOSPHONIC ACIDS

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian No 12, 1977, pp 2707-2712
manuscript received 1 Apr 76

KONDRAT'YEV, Yu. A., YEMEL'YANOVA, O. N., SHEVTSOVA-SHILOVSKAYA, K. D.,
NEGREBETSKIY, V. V. and DYMOVA, S. F., All-Union Scientific Research
Institute for Means of Plant Protection

[Abstract] In a search for pesticides, the authors synthesized esters and amides of β -dialkylamino- β -methylvinylphosphonic acids and their quaternary salts, which had not been described earlier, expecting that the creation of a polar onium group in the molecule would increase the physiological activity of the compounds. The reaction of alcoholysis of derivatives of trivalent phosphorus containing the P-N bond with propargyl alcohol was studied. Alcoholysis of O,O-dimethyl-N,N-diethylamido-

phosphite and O-ethyl-bis(N,N-diethylamido)phosphite produces only acetylene-allene isomerization, while alcoholysis of tris(N,N-diethylamido)-phosphite produces acetylene-allene-acetylene isomerization. The reaction of alkylation of esters of β -dialkylaminopropenophosphonic acids yields compounds with slight fungicidal activity. Figure 1, Tables 4, References 9: 5 Russian, 4 Western.

USSR

UDC 546.185+547.234

REACTIONS OF 1-TRICHLOROPHOSPHAZO-1,1-DICHLOROALKANES WITH HYDRAZINES

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian No 12, 1977, pp 2713-2717
manuscript received 17 May 76

KASHEVA, T. N. and KUKHAR', V. P., INSTITUTE OF ORGANIC CHEMISTRY, Academy of Sciences, Ukrainian SSR

[Abstract] The reaction of 1-trichlorophosphazo-1,1-dichloroalkanes with amidines, nitriles, ammonium salts and hydroxylamine leads to the formation of phosphorus-containing heterocycles with the N = P-N fragment. The formation of phosphorus-containing heterocycles therefore also seemed probable in the reactions on 1-trichlorophosphazo-1,1-dichloroalkanes with hydrazine and substituted hydrazines. This should result in the formation of monomer or dimer 3,3-dichloro-1,2,4-triaza-3-phospholes. In fact, 1-trichlorophosphaza-1,1-dichloroalkanes react with hydrazine hydrochloride at the α -carbon atom to form 1,1-asinodi-1-trichlorophosphazoalkanes, and with 2,4-dinitrophenylhydrazine to form 2,4-dinitrophenylhydrazono-1-trichlorophosphazoalkanes. References 6: Russian.

USSR

UDC 541.127:547.241

THE REACTIVITY OF DIALKYLPHOSPHITES IN CONDENSATION REACTIONS WITH CHLORAL

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian No 12, 1977, pp 2698-2701
manuscript received 1 Apr 76

VORONTSOVA, N. A., VLASOV, O. N., BOGEL'FER, L. Ya. and MEL'NIKOV, N. N.,
All-Union Scientific Research Institute for Chemical Means of Plant Protection

[Abstract] A study was made of the kinetics of the interaction of chloral with dialkylphosphites other than dimethylphosphite in order to relate their reactivity to their structure. Both with no solvent and with dioxane, the variation of reactivity of these substances with structure is described by the Kabachnik equation $\log k = \log k_0 + \rho \epsilon (\sigma_I^\phi + \sigma_R^\phi)$, where ϵ is a coefficient showing the participation of the resonant component in the correlation equation and may be greater or less than 1, with the primary influence in the equation being that of the resonant component. Figures 2, Tables 2, References 10: Russian.

USSR

UDC 547.241

ARBUZOV REGROUPING OF TETRAALKYL ESTERS OF METHYLENEDIPHOSPHONOUS ACID

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian, No 12, 1977, pp 2689-2698
manuscript received 18 May 76

PRISHCHENKO, A. A., NOVIKOVA, Z. S. and LUTSENKO, I. F., Moscow State University

[Abstract] A study is made of the Arbuzov regrouping of tetraalkyl esters of methylenediphosphonous acid. A preparative method is suggested for the synthesis of 3 types of methylenediphosphorus-containing compounds, including the phosphinate group in the molecule. Hydrolysis of tetraalkylmethylenediphosphonites and methylenediphosphorus-containing compounds produces compounds of a new type, containing a hydrophosphoryl group in the molecule. The reaction can be extended to a broad range of compounds with mobile hydrogen atoms in the molecule. Figures 3, Tables 2, References 5: 1 Russian, 4 Western.

USSR

UDC 547.241+547.341

STUDY OF THE REACTIONS OF PRIMARY CHLOROPHOSPHINES WITH KETONES IN THE PRESENCE OF ACETIC ACID OR ACETIC ANHYDRIDE BY NMR SPECTROSCOPY

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian No 12, 1977, pp 2685-2689
manuscript received 13 May 76

NURTDINOV, S. Kh., ISMAGILOVA, N. M., ZYKOVA, T. V., SALAKHUTDINOV, R. A. and TSIVUNIN, V. S., Kazan Institute of Chemical Technology
imeni S. M. Kirov

[Abstract] The authors reported earlier that primary chlorophosphines react with cyclic ketones in the presence of acetic acid to form derivatives of α -oxyxycloalkylphosphinic acids. Continuing these studies, the authors investigate the interaction of primary chlorophosphines with cyclohexanone in the presence of acetic anhydride and aliphatic alcohols. In all cases, the reaction is accompanied by significant exothermic effects and results in the formation of a viscous syrup-like mass with a small quantity of crystalline product. Treatment with water or phosphorus pentachloride results in the formation of α -oxycyclohexyl- and cyclohexene-1-yl-phosphinic acids or cyclohexene-1-ylphosphinic acid chloride, regardless of the structure of the agent used. A mechanism is suggested for the reaction of trivalent phosphorus acid chlorides with saturated ketone in the presence of a proton donor such as acetic acid, acetic anhydride or aliphatic alcohols. Figures 2, References 8: 7 Russian, 1 Western.

USSR

UDC 547.26'118+543.253

POLAROGRAPHIC BEHAVIOR OF ORGANIC HYDRAZINES. VI. OXIDATION OF SEMI-CARBAZIDO(THIOSEMICARBAZIDO)-PHOSPHONATES AND -THIOPHOSPHONATES

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian No 12, 1977, pp 2654-2659
manuscript received 17 Dec 75

TRENTOVSKAYA, L. K. SUPIN, G. S., MAL'NIKOV, N. N., MIKHAYLOVA, O. B. and GRAPOV, A. F., All-Union Scientific-Research Institute for Chemical Methods of Plant Protection

[Abstract] This work is dedicated to the study of the mechanism of oxidation of phosphorylated semicarbazides and thiosemicarbazides on a mercury dropping electrode. The compounds are studied by the method of classical polarography, single-pulse oscillopolarography, anodic volt-ampereometry on a rotating platinum microelectrode; the products of

preparative electrolysis are analyzed and electrocapillary curves are measured. In alkaline media, oxidation on the mercury anode results in the formation of nitrogen, the products of hydrolysis of derivatives of phosphonic acid and an unstable carbocation, which is converted to the corresponding amines and urea. In the presence of the thiophosphonates, both oxidation of the hydrazine group and the formation of complexes with mercury cations occur. Figure 1, Table 1, References 9: Russian.

USSR

UDC 547.495.2+543.5

STUDY OF THE INTERACTION OF MONOCALCIUMPHOSPHATE AND UREA BY METHODS OF ELECTRIC CONDUCTIVITY, pH AND INTERFEROMETRY

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian No 12, 1977, pp 2653-2654
manuscript received 17 Jan 76

YAKUBDZHANOVA, S. Ya., KASYMOVA, M. A. and ADYLOVA, M. A., Institute of Chemistry, Academy of Sciences, Uzbek SSR

[Abstract] A study of the system $\text{Ca}(\text{H}_2\text{PO}_4)_2\text{-CO}(\text{NH})_2\text{-H}_2\text{O}$ by measurement of conductivity, pH, and indices of refraction not only confirms the formation of the compound $\text{Ca}(\text{H}_2\text{PO}_4)_2 \cdot 4\text{CO}(\text{NH}_2)_2$ in this system, but also reveals a new compound, $\text{Ca}(\text{H}_2\text{PO}_4) \cdot \text{CO}(\text{NH}_2)_2$. Figure 1, References 3: 1 Russian, 2 Western.

USSR

UDC 541.127

RATE CONSTANTS OF TRIPLE RECOMBINATION OF ATOMS OF IODINE $\text{I}(^2\text{P}_{3/2})$ IN A MEDIUM OF GASEOUS IODIDES $(\text{CF}_3)_2\text{PI}$ AND $(\text{CF}_3)_2\text{AI}$

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian No 12, 1977, pp 2646-2649
manuscript received 25 May 76

KHOMENKO, V. Ye., SKOROBOGATOV, G. A. and SYMOV, B. P., Leningrad State University

[Abstract] This study was a quantitative investigation of the rate constants of the gas phase reactions of triple recombination of iodine atoms as mentioned in the title and the clarification of the question as to whether the behavior of the iodides mentioned differs radically from the behavior of alkyl- and perfluoralkyliodides. Impulse photolysis, in

combination with kinetic spectroscopy, was used to study the triple recombination of atomic iodine in these reactions. It was found that the process follows a third order rule in the range of temperatures and pressures studied (380-456° K, 5-40 mmHg). The rate constants of the recombination process were determined. Extrapolation was used to produce the rate constant of recombination of iodine in the presence of $(CF_3)_2SBI$. Figure 1, Tables 2, References 15: 10 Russian, 5 Western.

USSR

UDC 547.314.2+547.269.1+661.833.511

TRIETHYLPHOSPHINE OXIDE AND KOH: A NEW SYSTEM FOR ACCELERATING NUCLEOPHILIC ADDITION TO ACETYLENES

Leningrad ZHURNAL ORGANICHESKOY KHIMII in Russian No 10, 1977 pp 2229-2230
manuscript received 11 Apr 77

TROFIMOV, B. A., AMOSOVA, S. V., AL'PERT, M. L., and SKATOVA, N. N., Irkutsk Institute of Organic Chemistry, Siberian Division, USSR Academy of Sciences

[Abstract] In continued investigation of unusual nucleophilic reactions of acetylenic compounds, it was found that in a triethylphosphine oxide medium, when alkali and hydroquinone were present, the reaction of hydrated sodium sulfide with phenylacetylene form cis-cis-di(2-phenylvinyl)-sulfide at a 90% yield. Potassium thioacetate in similar conditions also leads to the sulfide at a 90% yield. In contrast, the sulfide yield for this reaction in a dimethylsulfoxide-KOH (DMSO-KOH) system is only 44%. References 5: 3 Russian, 2 Western.

USSR

UDC 547.365.8

REACTION OF DIACETYLENIC ALCOHOLS $RC \equiv CCH(OH)C \equiv CH$ WITH TRIPHENOXYMETHYLPHOSPHONIUM IODIDE

Leningrad ZHURNAL ORGANICHESKOY KHIMII in Russian No 10, 1977 pp 2227-2228
manuscript received 12 Jun 76

PEYTEL, A. N., University of Nigeria, Chemistry Department, Nsukka, Nigeria

[Abstract] Reactions of diacetylenic alcohols $RC \equiv CCH(OH)C \equiv CH$ with triphenylmethylphosphonium iodide were studied by adding the alcohols to the reaction,

then heating the mixture on a water bath at 80-90° until a homogeneous liquid resulted. From 1,4-pentadiin-3-ol, 1-iodo-1,2-pentadiene-4-yne was obtained with a 37% yield. From 6,6-dimethyl-1,4-heptadiin-3-ol 1-iodo-6,6-dimethyl-1,2-heptadiene-4-yne was obtained at a 4.13% yield. Under the same conditions, 1,4-hexadiin-3-ol and 1,4-undecadiin-3-ol form, respectively, 1-iodo-1,2-hexadien-4-yn and 1-iodo-1,2-undecadien-4-yne, with phenols and isomeric iodacetylenes as impurities. Washing the reaction mixture with an ice-cooled 2% NaOH aqueous solution failed to remove the phenolic impurities. 5-Phenyl-4-penten-1-yn-ol forms 1-iodo-5-phenyl-1,2,4-pentatriene, darkening rapidly, then decomposing. References 3: 1 Russian, 2 Western.

USSR

UDC 547.466.23+547.26'123+547.387.415.3

ESTERS OF THIOCARBOXYLIC ACIDS. II. DEHYDRATION OF S-ESTERS OF N-MONOACYL-
ALPHA-AMINOTHIOCARBOXYLIC ACIDS WITH DIACID CHLORIDES OF PHOSPHORUS ACIDS

Leningrad ZHURNAL ORGANICHESKOY KHIMII in Russian No 10, 1977 pp 2139-2141
manuscript received 2 Aug 76

GOLOLOBOV, YU. G., and KRUGLIK, L. I., Institute of Organic Chemistry,
Academy of Sciences, Ukrainian SSR

[Abstract] Diacid chlorides of phosphorus acids in the presence of excess triethylamine were found to dehydrate S-esters of N-monoacyl-alpha-amino-thiocarboxylic acids. The lesser liability of hydrogen atoms in the alpha-position to the carboxyl group in these esters, ketones, and aldehydes was judged to contribute to fewer by-product reactions and simpler dehydration products. The dehydration reaction forms N-alkylketenimines containing an alkylthio group at the carbon atom. By reaction of N-alkylketenimines with alcohols, mercaptans and secondary amines, the corresponding addition products were formed; infrared and paramagnetic resonance spectroscopic data showed the addition products to exist in the iminoform. Figures 1, References 13: 6 Russian, 7 Western.

USSR

UDC 542.91:547.1'118

SOME METHYLPROPYLDITHIOPHOSPHINATES AS POSSIBLE INSECTICIDES

Moscow IZVESTIYA AKADEMII NAUK SSSR--SERIYA KHIMICHESKAYA in Russian No 2, Feb 78 pp 503-507 manuscript received 19 Jul 77

MASTRYUKOVA, T. A., SHIPOV, A. E., ZHDANOVA, G. V., KAGAN, YU. S., YERSHOVA, YE. A., GUSEVA, N. A. and KABACHNIK, M. I., Institute of Metal Organic Compounds, Academy of Sciences USSR, Moscow

[Abstract] Reaction of sodium methylpropyldithiophosphinates with a series of alkyl halides yielded analogues of methylpropyldithiophosphinic acid and of the analogues of known insecticide M-74 (Disystone) and Rogor. The products exhibited a range of insectoacaricidal properties, showing that substitution of the ethoxy group in methyldithiophosphonic compounds by a propyl group leads to marked changes in the physiological properties. References 7: 4 Russian, 3 Western.

USSR

UDC 632.95.024.2/.391

METHODS OF METABOLIC BREAKDOWN OF ORGANOPHOSPHORUS PESTICIDES

Moscow KHIMIYA V SEL'SKOM KHOZYASTVE in Russian No 1, 1978 pp 54-64

ROZENGART, V. I., Doctor of Medical Sciences, Institute of Evolutionary Physiology and Biochemistry imeni I. M. SECHENOVA, Academy of Sciences USSR

[Abstract] An important aspect of the toxicity of organophosphorus pesticides is the pathway by which they are metabolized. The reactions are broken down into four categories: I. the hydrolytic cleavage (hydrolysis) with the subcategories: 1. hydrolysis of the P bonds, including phosphoro-ester and phosphoroamido bonds; 2. hydrolysis of the carboxyester bonds; 3. hydrolysis of the carboxyamido bond; and 4. hydrolysis of the N-alkyl bond; II. the transfer of alkyl and aryl groups; III. oxidation-reduction transformations with subcategories: 1. oxidative desulfurization; 2. oxidation of alkyl groups; 3. oxidation of thioester-sulfur; 4. oxidative O-dearylation; 5. oxidative O-dealkylation; 6. oxidative N-dealkylation; and 7. reduction of nitrogen groups; and IV. dehydrohalogenation. Each section is briefly described and the equations for a specific example shown. References 39: 5 Russian, 34 Western.

THE TOXICITY OF PERMETRIN TOWARDS HOUSE FLIES

Moscow KHIMIYA V SEL'SKOM KHOZYAYSTVE in Russian No 1, 1978 pp 49-50

SHAPOVALOVA, G. K. and POPOV, P. V., Candidate of Agricultural Sciences, All-Union Scientific Research Institute of Chemical Compounds for the Protection of Plants

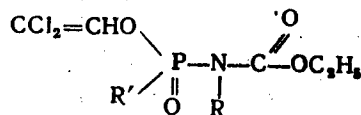
[Abstract] Permetrin, in contrast to other pyrethroid compounds is rather stable towards photolysis. It is composed of a racemic mixture of the 3-phenoxybenzy esters of (+)--cis,trans-2,2-dimethyl-(2,2-dichlorovinyl)-cyclopropane-carbonic acid with a 1:4 cis:trans isomer ratio. Permetrin is much more toxic ($LD_{50} = 0.23 \pm 0.04$ microg/g) to house flies than the other compounds tested: dichlorophos (1.30 ± 0.25), Neopinamine (2.54 ± 2.1). The extensive use of chlorophos to control house flies has resulted in a population having a significant resistance to these compounds. Little cross-resistance appears to have developed in these populations towards permetrin, however, as the LD_{50} for this population (0.64 ± 0.11) is only slightly larger than for the sensitive population (0.23 ± 0.04 micrograms/g). References 6: 1 Russian, 5 Western.

BIOLOGICAL ACTIVITY AND MECHANISM OF TOXIC EFFECT OF THE DICHLOROVINYLESTERAMIDES OF ETHYLURE THANOPHOSPHORIC ACID

Moscow KHIMIYA V SEL'SKOM KHOZYAYSTVE in Russian No 1, 1978 pp 45-49

NEKLESOVA, I. D., Candidate of Medical Sciences; ALIMOV, P. I., ANTOKHINA, L. A., Candidate of Chemical Sciences; IRAYIDOVA, I. S., KUDRINA, M. A., Candidate of Biological Sciences; KALIMULLIN, M. K., Livanova, Candidate of Medical Sciences; and ANISIMOVA, N. N., Institute of Organic and Physical Chemistry imeni A. Ye. Arbuzova

[Abstract] The title study was carried out on three compounds having the general formula



where $R=H$; CH_3 and $R'=(CH_3)_2N$ and $(C_2H_5)_2N$. Both in vitro and in vivo experiments were used to determine the esterase activity as a measure of toxicity; and the two types of experiments yielded similar results. The activity of the esterase began to decrease in the days following an injection of the compound, however, being greater for the carboxyl-esterase (to 70-80%) than for the Cholinesterase (30-40%). The mechanism of toxicity of the title compounds both for insects and for warm-blooded animals is the suppression of the enzyme cholinesterase. References 12: 9 Russian, 3 Western.

USSR

UDC 632.951.028:543.544.42

CHROMATO-ENZYME METHOD FOR THE INDIVIDUAL DETERMINATION OF PHOZALON AND ITS METABOLITES IN APPLES AND APPLE TREE LEAVES

Moscow KHIMIYA V SEL'SKOM SHOZYAYSTVE in Russian No 1, 1978 pp 64-67

FATEYEVA, O. F. and POPOVA, V. A., Kazan Scientific Research Institute for the Protection of plants

[Abstract] The samples are extracted with chloroform and the sample separated by thin-layer chromatography in a 4:1 hexane-acetone system. The band at about $R_f=0.5$ is eluted and the concentration of phozalon and its toxicity were determined from a change in the color of this solution. The quantitative determination was made using a calibration curve. The sensitivity of this method is 0.5 micrograms of material in the sample; if the pesticide is not eluted off the chromatographic plate, a sensitivity of 1.0 micrograms can be obtained. Metabolic breakdown products of phozalon occur at R_f values of 0.0, 0.2, 0.35 and 1.0 during the thin layer chromatographic procedure. The toxicity of these metabolites was established but the compounds have not yet been identified. References 6: Russian.

USSR

UDC 632.951:595.731:635.9

INSECTICIDES AGAINST THRIPS ON FLOWERING PLANTS

Moscow KHIMIYA V SEL'SKOM KHOZYAYSTVE in Russian No 1, 1978 pp 43-45

TKACHUK, V. K., State Nikitskiy Botanical Garden

[Abstract] Laboratory and field studies were carried out to evaluate the toxicity of a series of organophosphorus compounds; DDVF, phthalophos,

benzophosphate, Bi-58, phosphation, melathion, neksion, rogor, phozalon and tsidial. Under laboratory conditions, dosages of 1 liter per 1 m² of ground were applied. Residual toxicities were also evaluated. Almost all of the compounds were highly effective at concentrations of 0.1 and 0.2% against the destructive stages (larva and imago) on gladiolus, cloves and tobacco, but not phytotoxic for the plants themselves. The effectiveness of the insecticides after 25 days decreased in the order: melathion (88%), rogor (69%), tsidial (51%), control (10%), phozalon (3%).

USSR

UDC 632.951

COMPOUNDS TO COMBAT THE COLORADO BETTLE

Moscow KHIMIYA V SEL'SKOM KHOZYAYSTVE in Russian No 1, 1978 pp 40-43

ABELENTSEVA, B. M., Candidate of Agricultural Science; SEDYKH, A. S., Candidate of Agricultural Science; POPOV, P. V., and ZHURAVLEVA, V. I., VNIИ (All-Union Scientific Research Institute) of Compounds for the Protection of Plants

[Abstract] Thirteen common insecticides are compared for their suitability against the Colorado beetle. These insecticides are generally mixtures of four active ingredients: polychloropinene, polychlorocamphene, chlorophos and gammahexachlorocyclohexane. Chlorophos results in the strongest initial effect but its residue is unstable and disappears rather rapidly from the leaf. The other three chemicals are unsatisfactory from a health standpoint. The toxicity of the insecticides plus the effectiveness of various methods of application were evaluated under laboratory conditions. Each compound is discussed in terms of potency towards the beetles and other types of organisms, rate of degradation, longevity and other factors which would influence its suitability for particular applications. References 8: 7 Russian, 1 Western.

SYNTHETIC INVESTIGATIONS OF INSECT ATTRACTING COMPOUNDS (SEX ATTRACTANTS).

III. CONVENIENT METHOD OF PREPARING HIGHER DIALKYLACETYLENES, SYNTHESIS OF MUSCARULA, ATTRACTANT FOR THE HOUSEFLY DOMESTICA L.

Leningrad ZHURNAL ORGANICHESKOY KHIMII in Russian No 10, 1977 pp 2049-2052 manuscript received 27 Sep 76

KOVALEV, B. G., STAN, V.V., ANTOCH, T. K., KONYUKHOV, V. P., and NEDOPEKINA, S. F., All-Union Scientific Research Institute of Biological Method of Plant Protection, Kishinev

[Abstract] 1-Dodecine was alkylated with nonylhalogenides in phosphoric acid hexamethyltriamide as solvent to prepare muscarula, a sex attractant for the housefly *Domestica L.* Optimal alkylation conditions were using the solvent separately or in a mixture with tetrahydrofuran, a reaction temperature of 20°-45° C, and a reaction time of 2-24 hr, depending on the temperature. Chemically, muscarula is cis-9-tricosene; also prepared this way were the following sex attractants: 2-methyl-heptadecane, an attractant for several species of the genus *Holomelina*, and tricosane, a chairo-mone for *T. evanescens*. Table 1; References 9: 2 Russian, 7 Western.

USSR

UDC 615.417'412.43

CHLOROETHANOL (ETHYLENECHLOROHYDRINE) - ONE OF THE TOXIC METABOLITES OF
1,2-DICHLOROETHANE

Moscow FARMAKOLOGIYA I TOKSIKOLOGIYA in Russian Vol 41, No 1, Jan/Feb 78
pp 118-120 manuscript received 27 Nov 76

KOKAROVTSOVA, M. G. and KISELEVA, N. I., Laboratory of Experimental Therapy
and Analytical Chemistry, All-Union Scientific Research Institute of
Hygiene and Toxicology of Pesticides, Polymers and Plastics, Kiev

[Abstract] By means of the gas-liquid chromatography of blood and liver
extracts of experimental rats exposed to an LD₅₀ dose of 1,2-dichloroethane,
chloroethanol has been identified as one of the metabolites. Because
of the fact that chloroethanol, as well as monochloroacetic acid (to which
dichloroethane is converted in the bodies of warm blooded animals) is
more toxic than the starting agent, the metabolic process occurred via the
so called "lethal synthesis" pathway. Figures 1, References 6: 1 Russian,
5 Western.

USSR

UDC 615.217.34.015.45:612.822.1

EFFECT OF M-CHOLINE BLOCKING AGENTS AND PHYSOSTIGMINE ON EMOTIONAL RE-
ACTIVITY AND CATECHOLAMINE METABOLISM IN RATS' BRAINS

Moscow FARMAKOLOGIYA I TOKSIKOLOGIYA in Russian, Vol 41, No 1, Jan/Feb 78
pp 28-32 manuscript received 18 Jan 77

ZHARKOVSKIY, A. M., ALLIKHMETS, L. KH. and ANNUK, K. E., Chair of
Pharmacology, Tartu University

[Abstract] Experimental results show that the dopaminergic system is
controlled continuously by the cholinergic system. Choline blocking
agents and physostigmine principally affect the activity of the brain's
cholinergic system. Specifically, atropine and amyryl (benactyzine)
showed a tranquilizing effect on emotional reactivity and aggressiveness,
without affecting the metabolism of endogenous dopamine. Both atropine
and amyryl potentiate the action of L-DOPA on emotional behavior and in-
crease the content of homovanillic acid in the brains of experimental
animals. Physostigmine acts as an antagonist of L-DOPA but also leads
to higher levels of homovanillic acid. An assumption has been stated that
the effect of M-choline blocking agents and physostigmine on the emotional
reactivity and aggressiveness depends to a large extent on the activity
of the dopaminergic system of the brain. Figures 2, References 20: 2
Russian, 18 Western.

USSR

UDC 615.214.31.015.4:612.833.81

COMPARISON OF THE INFLUENCE OF SYDNOCARB AND OTHER PSYCHOPHARMACEUTICAL STIMULANTS ON THE DIFFERENTIATION AND PREDICTION PROCESSES DURING THE EXECUTION OF CONDITIONAL FOOD-PROCURING REFLEXES

Moscow FARMAKOLOGIYA I TOKSIKOLOGIYA in Russian, Vol 41, No 1, Jan/Feb 78
pp 5-8 manuscript received 10 Jan 77

BELOZERTSEV, YU. A., and FOMIN, S. N., Chair of the Pharmacology, Chitinsk Medical Institute

[Abstract] The effect of sydnocarb was compared with the effects of other psychostimulators concerning the differentiation of conditional stimulants and prediction of the frequency of reinforcement. The experiments were performed on white rats, using sound and sound + light as the stimulating agents in a Y shaped labyrinth. The experiments showed that the effect of sydnocarb depends on the initial state of conditional reflex activity. In doses of 10 and 20 mg/kg, sydnocarb lowered the number of errors in the process of differentiating positive and negative reflex signals. Analogous properties have been manifested only for low doses of amphetamine (0.5 mg/kg), caffeine (20 mg/kg) and acephen (10 mg/kg). Sydnocarb reduced the number of runs to a rarely reinforced feeding branch and stimulated an active selection of the latter. Amphetamine at a dose of 1 mg/kg, caffeine at 20 mg/kg and acephen at 20 mg/kg registered analogous reaction tendencies. References 4: All Russian.

USSR

SECOND ALL-UNION SYMPOSIUM ON "DIRECTIONAL SYNTHESIS AND REACTION MECHANISM OF PHYSIOLOGICALLY ACTIVE COMPOUNDS AND PHARMACEUTICALS"

Riga KHIMIYA GETREROTSIKLICHESKIKH SOYEDINENIY in Russian No 12, 1977
pp1695-1696

LIDAK, M. YU. and SUKHOVA, N. M.

[Abstract] The symposium was held in Riga on Jan 17-19, 1977. About 200 scientists from leading institutes in the USSR attended and 34 papers were given. Consideration was given to the problems of developing effective compounds having anti-tumor and anti-viral properties based on the recent advances in organic and bio-organic chemistry, molecular biology and biochemistry, pharmacology and chemotherapy. Authors and titles for most of the papers are given, including the following: "Consideration of the Synthesis of Lipids Containing Cytotoxic Groups, Antibiotics,

Antibiotics, Oligopeptides, Ribonucleotides"; "Two Processes for Preparing a New Tupe of Nucleoside" and a number of papers on the preparation of new physiologically active compounds and the mechanisms of their operation. A resolution was submitted suggesting the prospects of further developments in these areas.

USSR

UDC 613.63:546.15

IODINE AS AN INDUSTRIAL POISON

Moscow GIGIYENA I SANITARIYA in Russian No 12, 1977 pp 90-92

ALIYEVA, Z. A., ROSHCIN, A. V., and BEGISHEVE, A., Central Institute of Postgraduate Medicine, Moscow; Azerbaydzhan Institute of Postgraduate Medicine imeni A. Aliyev, Baku; Ashkhabad Institute of Epidemiology and Hygiene, Ministry of Health Turkmen SSR

[Abstract] A review is presented of the role of iodine as an industrial poison and certain of its toxic effects. Long term effects of exposure to iodine (vapors) primarily involve the respiratory tract (rhinitis, pharyngitis, sinusitis, bronchitis, emphysema), eyes, thyroid gland, and depression of the immune system. Experimental studies conducted with albino rats have established that the threshold for the specific effects of iodine i.e., on the thyroid gland) is 5 mg/m^3 ; 10 mg/m^3 is the threshold for mucous irritation, and 30 mg/m^3 is the threshold for acute toxicity due to iodine vapors. Although the respiratory tract constitutes the major route of entry of iodine into the body a certain amount is also taken up via the unbroken skin. Approximately 70% is eliminated via urine, stools, and perspiration. The maximum permissible concentration of iodine in the air of work areas has been established as 0.5 mg/m^3 . Workers in danger of exposure should receive a thorough medical examination every 6 months with special attention accorded to thyroid function, the respiratory organs, the visual system, neurology, and hematologic indices. References 2: Russian.

USSR UDC 615.285.7.099.036.11.07:/616.155+616.419-018.1/-091.8.-076.5

GENERAL MORPHOLOGY AND ULTRASTRUCTURE OF BLOOD AND BONE MARROW CELLS IN
ACUTE EXPERIMENTAL POISONING WITH ANTHIO, AN INSECTICIDE

Moscow GIGIYENE I SANITARIYA in Russian No 12, 1977 pp 89-90

KHAMIDOV, D. KH., Professor, DEMIDENKO, N. M., Professor, NISHANABAYEV, K.N.,
Candidate of Medical Sciences, ZHURAVLEV, R. A., and BAKHADYROV, M. A.,
Tashkent Medical Institute

[Abstract] Hematologic and ultrastructural studies were performed on bone marrow and blood cells of outbred male albino rats subjected to intragastric administration of a maximum tolerable dose of the insecticide anthio (150 mg/kg). Blood and bone marrow examinations on days 1,3,5,7, 10,14 and 30 revealed changes characteristically induced by organophosphorus compounds. Hemoglobin levels and erythrocyte counts began to decrease within a day and reached their lowest values on day 5 (25.5% and 35% decreases, respectively). A simultaneous shift to the juvenile elements was seen in the bone marrow erythroid line. Within 1-3 days moderate leukopenia was evident which was replaced by leukocytosis which reached a maximum on day 7. Bone marrow changes in the myeloid line corresponded to the blood picture in terms of juvenile and adult forms. Lymphoid elements in the bone marrow remained depressed during the course of the study. Electron micrographs revealed nuclear changes in erythroblasts and lymphocytes (increased chromatic density, widening of perinuclear zone, etc.), as well as marked aberrations in the mitochondria and Golgi apparatus of the myeloid line. The number of bone marrow and blood cells with structural aberrations began to diminish by the 10th day and by day 30 such cells were rarely observed.

USSR

UDC 615.9.076.7

BACTERIAL DEHYDROGENASE ACTIVITY IN THE EVALUATION OF CHEMICAL TOXICITY

Moscow GIGIYENA I SANITARIYA in Russian No 12, 1977 pp 69-72

YUROVSKAYA, YE. M., Candidate of Biological Sciences, Kiev Scientific
Research Institute of General and Communal Hygiene imeni A. N. Marzayev

[Abstract] Since coliform counts constitute an important index of the sanitary condition of water and any chemical agent that would lower these counts may lead to an erroneous conclusion on the microbiological quality of the water being tested, a rapid method was devised for testing chemicals for antibacterial activity based on bacterial glucose dehydrogenase activity. The 3 ml reaction mixture consists of the following: 1.2 ml 1/15 M

Na_2HPO_4 , 0.5 ml 0.1 M glucose, 0.1 ml 0.1 M MgSO_4 , 0.2 ml 0.5% triphenyltetrazolium chloride, 1 ml microbial suspension (0.32-0.34 reading on a colorimeter, 5 mm cuvette, green filter) and the chemical in question in gm/L. Following 2 hr of incubation at 37° 3 ml of glacial acetic acid is added to disrupt the cells, and the released formazan is extracted with 3 ml of toluene. The latter is read at 490 nm in a colorimeter and the formazan concentration obtained from a standard curve. Tests conducted with chlorophos showed inhibition of escherichia at a concentration of 0.5 gm/L in sample water; the metabolic tests for antibacterial activity is thus much more sensitive and rapid than tests which rely on growth inhibition and require up to 48 hr and show inhibitory activity at chlorophos concentrations of 1-10 gm/L. References 6: Russian.

USSR

UDC 613.632:[613.155.3:615.285.7

ESTABLISHMENT OF MAXIMUM PERMISSIBLE CONCENTRATIONS AND APPROXIMATELY SAFE LEVELS OF HERBICIDES BASED ON HALOGEN SUBSTITUTED ANILIDES OF CARBOXYLIC ACID IN THE AIR OF THE PRODUCTION SECTOR

Moscow GIGIYENA TRUDA in Russian No 12, Dec 77 pp 30-33 manuscript received 15 Mar 76

PAN'SHINA, T. N., Institute of Hygiene and Toxicology of Pesticides, Polymers and Plastics, Kiev

[Abstract] Concentrations of a number of pesticides in the working zone of airplane pilots and sprayers (manual or machine sprayers) has been determined. Most of them show low to medium toxicity upon single exposure, but some exhibited cumulative properties. In order to determine possibly harmful effects, toxic and threshold levels of propainde, ramrod and solan have been determined for acute and chronic exposures. Hygenic studies showed that the maximum permissible levels for these agents are: propanide: 0.1 mg/m³, ramrod: 0.5 mg/m³ and solan: 1 mg/m³. The approximate safe levels were calculated for dicryl - 0.1 mg/m³, CB=52223 - 0.3 mg/m³, suffixe - 0.5 mg/m³ and lasso - 0.5 mg/m³. Since all of these levels may be exceeded during the spraying operations, individual protective measures were highly recommended. References 6: all Russian.

USSR

UDC 615.917+613.632]:547.46

TOXICITY OF SOME METACARBORANES USED IN THE SYNTHESIS OF THERMOSTABLE POLYMERS

Moscow GIGIYENA TRUDA in Russian No 1, Jan 78 pp 42-43 manuscript received
20 Jul 76

DENISENKO, P. P., LEBEDEVA, D. P., GRIDINA, V. F. and ZAVGORODNAYA, T. I.,
Sanitation-Hygenic Medicinal Institute, Leningrad

[Abstract] Toxicological results are reported for 1,7-bis(chlorodimethylxylyl)-meta-carborane and 1,7-bis(methoxydimethylxylyl)-meta-carborane. The test animals consisted of mice, rats and rabbits. The agents were administered by injection, inhalation, and by contact exposure. From the accumulated material safe doses were calculated. For the first agent it was 1 mg/m^3 , for the second - 2 to 5 mg/m^3 . The chlorine derivative affected lungs and liver, while the methoxy derivative acted on the kidneys. References 6: 4 Russian, 2 Western.

USSR

UDC 678.742.2

RETARDATION OF POLYMER COMBUSTION BY MEANS OF HYDROGEN HALIDES

Alma Ata IZVESTIYA AKADEMII NAUK KazSSR, SERIYA KHIMICHESKAYA in Russian
No 1, Feb 78 pp 60-62 manuscript received 24 May 76

GIBOV, K. M., NAZAROVA, S. A. and ZHUBANOV, B. A., Institute of Chemical
Sciences, Academy of Sciences, KazSSR, Alma Ata

[Abstract] An attempt was made to answer the question of why chlorine- and bromine-containing agents retard polymer combustion, while fluorine and iodine homologues do not. The working hypothesis stated that retardation of the combustion process was the result of an interaction of hydrogen halides with free radicals in the flame. All hydrogen halides are gasses; in order to introduce them into the polymers, they had to be first absorbed on ceolites which could be used as polymer fillers. The effect of hydrogen halides on the combustion of polymers was analyzed by the determination of the oxygen index for such reagent combination. Calculations of the thermodynamic and kinetic data led to the conclusion that the HF is the weakest retardant of polymer combustion, the HI being the strongest; the effect increased throughout the series. The retardation occurs as a result of a reaction in the flame itself and not because of any interaction in the polymer. References 7: 5 Russian, 2 Western.

USSR

UDC 678.746.22]01:543.874

INFLUENCE OF ANTIPYRENES ON THE PROPERTIES OF POLYSTYRENE AND POLYSTYRENE FOAM PRODUCTS

Moscow PLASTICHESKIYE MASSY in Russian No 11, 1977 pp 32-34

BEYLINA, V. I., KOLOSOVA, T. O., NOSAYEV, G. A., GAL'PERIN, V. M.
ANTONOVA, A. K., KRIVETS, L. I., GEFTER, Ye. L. and ROGACHEVA, I. A.

[Abstract] A study was made of the influence of phosphorus and halogen-containing antipyrenes and compositions based on them on the kinetic peculiarities of the process of polymerization, as well as the effectiveness of antipyrenes in the composition of polystyrene foam. Formulas and parameters for the synthesis of flame-retardant polystyrene, and the physical and mechanical properties of foam products produced the presence of selected antipyrenes are described. Tables present the physical and chemical properties of the antipyrenes, the properties of plastic foam produced from the various compositions and the physical and mechanical properties of flame-retardant polystyrene foam compositions. Two-bromophos,

tris-2, 3-dibromopropylphosphate and pentabromophenylallyl ether can be used to produce flame-retardant foaming polystyrene with good physical and mechanical properties and satisfactory molding properties.

USSR

UDC 351.77:614.777

PLANS OF COMPLEX UTILIZATION AND PROTECTION OF WATER RESOURCES AS A FORM
OF STATE REGULATION OF POPULATION WATER USE SANITATION IN THE FUTURE

Moscow GIGIYENA I SANITARIYA in Russian No 11, 1977 pp 35-38 manuscript
received 8 Jun 77

SHITSKOGO, A. P., Corresponding Member, Academy of Medical Sciences USSR,
AKULEV, K. I., Deputy Minister of Public Health of the RSFSR, Chief State
Sanitation Physician of the RSFSR, GURBICH, L. S., Professor, NOVIKOV, Yu. V.,
Doctor of Medical Sciences, SAVELOVA, V. A., Candidate of Medical Sciences,
and PLITMAN, S. I., Candidate of Medical Sciences, Moscow Scientific
Research Institute of Hygiene imeni F. F. Erisman

[Abstract] Hygiene institutes have participated in formulating plans
for the use and preservation of water resources. Solutions to the
problems of water utilization are applied from general principles to the
particular problem. Research of this nature began in the 1960's with the
first Soviet general plan for water resources. Participating in this
work were a large number of hygiene research institutes, chairs of medical
institutes and many sanitary epidemiologic stations. Subsequent investi-
gations and planning were done by juxtaposition of local watershed
district plans; presently work continues using local district and general
plans. Statistical indicators of water quality are the basis for planning
water practices. It is the task of hygiene institutes to collect and
analyze water systems. A case study of the Tom River is cited. Further
refinement of the work of the institutes is urged.

USSR

UDC 663.63:622.765

REMOVAL OF GREASE FROM WASTE WATER VIA PRESSURE FLOTATION

Kiev KHIMICHESKAYA TEKHNOLOGIYA in Russian No 6, Nov-Dec 77 pp 24-25
manuscript received 6 Jan 75

CHECHEL', P. S., CHIZHAYEV, Yu. Ye., SOBYAKIN, Yu. P., YANKOV, V. I. and
FISHMAN, S. A., Dneprodzerzhinskoye PD "Azot", Dneprodzerzhinskiy Industrial
Institute "ORGKHM" Combine

[Abstract] The process of pressure flotation using dissolved air is carried
out in the following stages: the aeration of the water under pressure,
the formation of air bubbles when the pressure is reduced to atmospheric,
and the separation of the emulsified particles of impurities together
with air bubbles. The principal improvement in this process as described

in the article is the method for the introduction of air. The waste water loaded with oil from the sludge separator is pumped into the mixing-dispersing unit for saturation with air which is fed in from a reservoir. The mixing-dispersing unit is a porous pipe having pore diameters from 10 to 100 microns which is mounted in a metallic body, furnished with connections for the introduction of water and air. The pressure in the pipe from the mixing-dispersing unit ranges from 2.0 to 2.5 atmospheres. The concentration of grease in the purified water varies within the limits of 0.2 to 0.7 grams/liter. A purification coefficient of 96% was obtained using the given parameters and a residence time of the water in the chamber of 20 minutes. References: 3 Russian.

USSR

UDC 628.543

TECHNOLOGIES FOR PROCESSING WATER FROM BIOLOGICALLY PURIFIED DISCHARGE TO SUPPLY CLOSED WATER SYSTEMS

Kiev KHIMICHESKAYA TEKNOLOGIYA in Russian No 6, Nov-Dec 77 pp 25-28
manuscript received 6 Jan 76

KOGANOVSKIY, A. M., LEVCHENKO, T. M. and GORA L. N.,

[Abstract] Municipal waste water after it has undergone a complete biological treatment, requires only percolation through a sand filter to be fit for use in industry. In order to implement a completely closed water circulating system, it is necessary to keep the salt content and thermostability of the circulating water constant. An equation is developed defining the conditions for a constant salt concentration. The effects of different terms and changes in those terms on the operation of the system are considered. Particular attention is given to ion exchange resins as a means of removing excess salts; however, the ion exchange resins also contribute organics to the water. These changes may be adequately followed by monitoring the chemical oxygen demand. The organics may be removed from the circulating water with activated charcoal. Several different types of activated charcoal together with various extraction conditions are considered. Both the ion exchange resin and the activated charcoal may be periodically regenerated. References: 4 Russian.

DESALINATION AS A PUBLIC HEALTH PROBLEM IN THE USSR

Moscow GIGIYENA I SANITARIYA in Russian No 12, 1977 pp 14-18

SIDORENKO, G. I., Academician, Academy of Medical Sciences USSR, and
RAKHMANIN, YU., A., Candidate of Medical Sciences, Institute of
General and Communal Hygiene imeni A. N. Sysin, Academy of Medical
Sciences USSR

[Abstract] A review is presented on research and accomplishments in the area of desalination in the USSR, including information on establishments--both academic and industrial--involved with the provision of safe potable water for domestic and commercial use. In the USSR major advancements in desalination occurred during the last ten years. At the present time distillation constitutes the most promising method of supplying adequate quantities of potable water in certain areas of the USSR. However, more recent extensive research has pointed to the effectiveness of electrodialysis as a means of securing drinking water from saline water. In addition, it is felt in some quarters that eventually reverse osmosis (hyperfiltration) will replace current methods.

Personalities

USSR

OBITUARY - A. V. SEMENOVSKIY

Moscow OZVESTIYA AKADEMII NAUK SSSR--SERIYA KHIMICHESKAYA in Russian No 3, Mar 78 p 736

[Abstract] A. V. Semenovskiy died 14 Dec 77; he was 49 years old. Dr. Semenovskiy was the Director of the Laboratory, Institute of Organic Chemistry Imeni N. P. Zelinskiy. In 1952 he graduated from the Moscow State University Imeni M. V. Lomonosov. In 1957 he defended his candidate thesis on halomethylation of aromatic compounds, working under I. N. Nazarov. His doctoral work concerned cyclization of linear isoprene compounds; he defended a doctorate dissertation in 1972. The principal interests of Dr. Semenovskiy were the mechanism and stereochemistry of electrophilic reactions of unsaturated systems, development of novel organic syntheses for pheromones, polyprenols and other biologically active compounds.

USSR

UDC 615.015(092)KOMENDANTOVA

M. V. KOMENDANTOVA (ON THE OCCASION OF HER 60TH BIRTHDAY)

Moscow FARMAKOLOGIYA I TOKSIKOLOGIYA in Russian Vol 41, No 1, Jan/Feb 78 pp 127-128

All-Union Scientific Society of Pharmacologists, Editorial Board of the Journal "Farmakologiya i Toksikologiya". Students and Coworkers

[Abstract] On the 23 Aug., 1977, N. V. Komendantova celebrated her 60th birthday and 35 years of her scientific work. She graduated from the Rostov-na-Donu high school in 1934 and completed the Ivanovks Medical Institute in 1939, where she started her academic career. The progress from an assistant to professor took place at the chair of pharmacology of the II Moscow Medical Institute. She earned her doctorate in 1955. She headed the chair of Pharmacology at the Moscow Medical Institute in 1960, where she continues working to this day. Her studies in the field of pharmacology of neurotropic agents and pain killers in stomatology led to substantial advances in this field. She devoted considerable effort to the teaching curriculum at the Institute, making a number of modifications. She was active in the Party, where she served several terms as the secretary. She also served on the editorial board of "Farmakologiya i Toksikologiya" journal.

Eastern Europe

EAST GERMANY

ALKALI PHOSPHORUS COMPOUNDS AND THEIR REACTIVITY. PART 77: METALIZATION OF PHENYLPHOSPHINE AND PHENYLARSINE

Leipzig ZEITSCHRIFT FUER ANORGANISCHE UND ALLGEMEINE CHEMIE in German Vol 437
Dec 77 pp 5-9 manuscript received 12 May 77

ISSLEIB, K., professor Dr, BLAUSZWEIT, A., Dr, and THORAU SCH, P., Dr,
Chemistry Section, Martin Luther University, Halle-Saale

[Abstract] Metalization of phenylphosphine and phenylarsine involves the elimination of hydrogen from P-P and As-As bonds. Metalization of phenylphosphine yields up to 10 percent 1,2-diphenyldiphosphide. Even if potassiumphenylphosphide is heated with excess potassium in dioxane for a long time, no further diphosphide will form. In contrast, potassium phenylarside, when heated in dioxane, slowly releases hydrogen and transforms into 1,2-dipotassium-1,2-diphenyldiarside. The latter behavior is similar to that of phenylstilbine. In general, the reaction between phenylphosphine and phenylarsine with n-butyl- or alkali-metals yields compounds of the general formula $C_6H_5P(As)Me$, where Me denotes the alkali metal (Li or K in the tests reported). The metalization of phenylphosphine and phenylarsine with n-butyllithium and metallic potassium was described. Elimination of the hydrogen yields compounds of the general formula $C_6H_5MeP(As)-P(As)MeC_6H_5$. Table 1, References 7: 5 German and 2 Western.

EAST GERMANY / WEST GERMANY

REACTIONS OF PHOSPHORUS PENTACHLORIDE AND TRICHLORIDE WITH BENZOHYDROXAMIC ACID. BENZOHYDROXIMATO DERIVATIVES OF PHOSPHORUS

Leipzig ZEITSCHRIFT FUER ANORGANISCHE UND ALLGEMEINE CHEMIE in German Vol 437
Dec 77 pp 53-59 manuscript received 21 Jun 77

FLUCK, E., professor Dr, and VARGAS, M., Institute of Inorganic Chemistry,
University, Stuttgart

[Abstract] The reaction between PCl_5 and benzohydroxamic acid, the fluorination of bis(benzohydroxamato)phosphorus(V) chloride, the reaction between SO_2 and bis(benzohydroxamato)phosphorus(V) chloride, and the reaction between PCl_3 and benzohydroxamic acid was investigated. The products were identified with the aid of nuclear magnetic resonance spectrometry. The reactions between the phosphorus chlorides and benzohydroxamic acid took place readily under reflux in benzene, and yielded spiro derivatives in which the phosphorus usually had the coordination number 5 or 6. Their

general formula was $\text{PCl}_3\text{BPCl}_5$, B_2PCl , and $\text{H}(\text{PB}_3)$ for PCl_5 , and BPCl and B_2PH for PCl_3 (B denotes the benzohydroxamato residue). B_2PCl yielded B_2PF upon fluorination. The compounds isolated so far showed pronounced similarity to the pyrocatechol derivatives of phosphorus, a class of compounds thoroughly investigated in recent years. The synthesis and chemical properties of the new compounds were described; their structures will be examined in a later report. References 14: 3 German and 11 Western.

EAST GERMANY / WEST GERMANY

CONTRIBUTIONS TO THE CHEMISTRY OF PHOSPHORUS. PART 74: 1,1-DIPHENYL-DIPHOSPHANE AND MONOMETHYLDIPHOSPHANE FROM THE REACTION BETWEEN DIPHOSPHANE AND TETRAPHENYLDIPHOSPHANE OR 1,2-DIPHENYLDIPHOSPHANE

Leipzig ZEITSCHRIFT FUER ANORGANISCHE AND UND ALLGEMEINE CHEMIE in German
Vol 437 Dec 77 pp 73-77 manuscript received 28 Feb 77

BAUDLER, M., professor Dr, and HEUMUELLER, H., Institute of Inorganic Chemistry, University, Koeln

[Abstract] The authors investigated the reactions of diphosphane with tetraphenyldiphosphane and 1,2-diphenyldiphosphane, which yielded the previously unknown compounds 1,1-diphenyldiphosphane and monophenyldiphosphane. The products were examined with the aid of nuclear magnetic resonance spectrometry. The reactions were carried out under a 1:1 reactant ratio in carbon disulfide or tetrahydrofuran under cooling. There were significant differences in the reaction rate depending on the conditions under which the reaction was carried out, primarily on the reaction temperature. All diphosphanes tended to disproportionate in the reaction mixture (the tetraphenyldiphosphane tended to do so the least). However, this could be suppressed by operating under exclusion of light. The presence of phenyl-substituted diphosphanes exerted a stabilizing effect on the unsubstituted diphosphane. It was assumed that four-center transition states form immediately in the reactions, especially if there is a pronounced electron-density difference at the phosphorus atoms of the reactants. Tables 2; References 12: 8 German and 4 Western.

EAST GERMANY / WEST GERMANY

THE BEHAVIOR OF MONO AND DIORGANYLPHOSPHINESULFIDES TOWARD METAL CARBONYL SYSTEMS. PART 41: THIOPHOSPHINIC ACID COMPLEXES WITH SULFUR -IVb ELEMENT BONDS

Leipzig ZEITSCHRIFT FUER ANORGANISCHE UND ALLGEMEINE CHEMIE in German
Vol 437 Dec 77 pp 162-168 manuscript received 17 Mar 77

LINDNER, E., professor Dr, and RODATZ, K.-W., Dr, Institute of Inorganic Chemistry, University, Tuebingen

[Abstract] Ligands of the type $[P(CH_3)_2S]_nE(CH_3)_{4-n}$, where E denotes elements in Group IVb of the periodic system such as Si, Ge, and Sn, and n denotes a number between 1 and 3, with trivalent phosphorus and P-S-E bonds are likely to be highly unstable. To build up such ligand systems on the complex, methyl-IVb-chlorine compounds of the general formula $(CH_3)_{4-n}ECln$ were treated with $[L_nMnP(CH_3)_2S]-$ in tetrahydrofuran 20° C. The yellow products, of the general formula $[L_nMnP(CH_3)_2S]_nER_{4-n}$, were obtained in high yield, and are usually crystalline at room temperature. Their sensitivity to atmospheric oxygen and moisture increases with increasing value of n. They are soluble in solvents such as aliphatic hydrocarbons; the solubility decreases from silicon to tin. The products were examined with the aid of mass spectrometry and infrared spectrometry, as well as 1H and ^{31}P nuclear magnetic resonance spectrometry. The cleavage of the Sn-S bond (for n = 1) with CF_3I was examined. The spectral data are presented in tabular form. Tables 5, References 21: 8 German and 13 Western.

EAST GERMANY / WEST GERMANY

THE BEHAVIOR OF MONO AND DIORGANYLPHOSPHINESULFIDES TOWARD METAL CARBONYL SYSTEMS. PART 42: THE CRYSTAL STRUCTURE OF 1,4-DIOXA-2,5-TETRAMETHYLDIPHOSPHA 3,6-OCTACARBONYLDIRHENACYCLOHEXANE, A NEW INORGANIC HETEROCYCLIC COMPOUND

Leipzig ZEITSCHRIFT FUER ANORGANISCHE UND ALLGEMEINE CHEMIE in German
Vol 437 Dec 77 pp 169-174 manuscript received 20 May 77

JUNDIG, G., SCHILLING, B., Dr, WEISHAUPT, M., Dr, LINDNER, E., professor Dr, and STRAEHLE, J., professor Dr, Institute of Inorganic Chemistry, University, Tuebingen

[Abstract] The compound $[-(OC_4ReP(CH_3)_2O-)]_2$, obtained in the reaction between gaseous NH_3 and $(OC)_4BrReP(CH_3)_2OH$ in petroleum ether, was separated from NH_4Br with H_2O and then recrystallized from methanol. The compact, colorless crystals are monoclinic, in Space Group $P2_1c$; the lattice constants are $a = 998.6$, $b = 1443.9$, $c = 1883.7$; $\beta = 132.60^\circ$. There

are four dimers in the elementary cell, and the calculated density is 2.51 g/cm³. The structure of the crystal resembles a distorted chair conformation for the Re(1) - O(10)-P(2)-Re(2)-O(9)-P(1) ring; the central ring segment formed by P and O atoms is practically planar. The P(1) - Re(1) - O(10) triangle plane is 48.7° inclined to the former, and the triangle P(2) - Re(2) - O(9) located above with a lesser angle of 15.5°. This difference in tilt was attributed to a packing effect. The two phosphorus-oxygen bond distances are identical, 153-154 pm. The Re-O distances are 215-218 pm.; the Re-P distances are 246-247 pm. Structural data and drawings are presented. Figure 1, Tables 2, References 15: 6 German and 9 Western.

HUNGARY

UDC 628.34/.35:628.162[546.17]:628.315.2(439)

METHODS FOR REMOVING THE NITROGEN CONTENT OF WASTEWATERS IN HUNGARY PART
2: BIOLOGICAL METHODS

Budapest MAGYAR KEMIKUSOK LAPJA in Hungarian Vol 33 No 1 Jan 78 pp 17-26
DOBOLYI, Elemer, and FARKAS, Peter, VITUKI [Scientific Research Institute
for Water Resources] No. III: Institute of Water-Quality Protection,
Budapest

[Abstract] Biological nitrification and denitrification appear to be the most suitable ways for removing nitrogen from Hungarian wastewaters, which contain most nitrogen in the organic form. The nitrification and denitrification methods are discussed, with special emphasis on the biochemical factors, kinetics (quantitative relationships, concentration effect, effect of temperature, effect of the sludge, critical and mutually exclusive reactions, and toxicity), and technologies. Various microorganisms may be used for nitrification (conversion of the nitrogen into nitrates); a removal plant is planned for the water catchment region of Lake Balaton. It would involve a residence time of 5-6 hours for nitrification, with the pH adjusted on the basis of titration and a sludge concentration of 1.5-2.0 grams per liter. For denitrification (the processes which biologically convert the nitrate nitrogen into gaseous nitrogen) it is proposed that raw wastewater be used as the electron donor (rather than methanol used for this purpose abroad). An experimental setup for the proposed system was built; it is briefly described. It achieves a 90 percent nitrogen removal. Tables 7, Figures 7, References 22: 5 Hungarian, 4 German, and 13 Western.

HUNGARY

UDC 678.01-426.494.061.7:536.464
678.5-426.029.65+677.862.516.2-149.4

FLAME-RETARDANT SYNTHETIC FIBERS

Budapest MAGYAR KEMIKUSOK LAPJA in Hungarian Vol 32 No 12, 1977 pp 631-636
VERTES, Eva, Hungarian Viscoes Factory, Nyergesujfalu

[Abstract] Flame-retardant fibers may be made by (1) using inherently non-combustible materials, (2) chemical or physical treatment, (3) chemical or physical fiber modifications, and (4) development of new flame-retardant polymers for fiber production. This review article discusses the status of the various approaches. Polyester fiber burns easier in admixture with cotton than alone; it may be flame-retardant treated with (2,3-dibromopropyl)-phosphate (also known as T23P or Tris). Polyamide fibers may be treated with surface coatings (such as thiourea), but inclusion of additives in the extrusion melt (such as Tris or halogen compound/oxide mixtures), or chemical modification of the extruded fiber (phosphorus compounds giving a 8-10 percent P content). Polyacrylonitrile fibers are most difficult to treat for flame retardancy among all synthetic fibers (various means were proposed, none is perfect as yet). Viscose fibers may be made flame-retardant by treating the fibers with phosphorus, nitrogen, or halogen derivatives (such as Proban [tetrakis(hydroxymethylphosphonium(chloride)] also known as THPC, with or without admixture of APO [trisaziridinylphosphineoxide]). The flame-retardant treatment may also affect other properties of the fibers. Tables 2, References 41: 5 German, 1 Japanese, 2 Russian, and 33 Western.

CSO: 1841

END